

TC-156

443

E Model
AEP Model



LL/STEREO CASSETTE-CORDER

SPECIFICATIONS

Power Requirements: 110 V, 127, 220 and 240 V,
AC 50/60 Hz (AEP)
100 ~ 110 V, 115 ~ 127 V, 200 ~ 220 V
and 230 ~ 250 V, AC 50/60 Hz (E)
DC 6V
 { Battery size "D" x 4
 { Rechargeable battery BP-8
 { Car Battery DC 12V by using SONY
 { car battery cord DCC-127

Power Consumption: AC 8.5 W (E)
AC 12 W (AEP)

Track System: Four-track stereo/LL

Tape Speed: 4.8 cm/s (1 7/8 ips)

Frequency Response: 40 ~ 10,000 Hz (at normal tape)
40 ~ 13,000 Hz (at chromium
dioxide tape)

Signal-to-Noise Ratio: 47 dB

Wow and Flutter: 0.22% (RMS) weighted.

Overall Distortion: 2.5%:

Erase Ratio: 60 dB

Cross Talk: 55 dB (between tracks)
26 dB (between channels)

Power Output: 1.5W maximum

Record Bias Frequency: Approx. 85 kHz

Erase Head: EF152-3602 (540 Ω /80 kHz)

Record/playback Head: PP128-3602 (750 Ω /1 kHz)

Motor: D-009F (servo controlled)

Built-in Microphone: C-1002A (electret condenser)

Automatic Shut-off Mechanism: Tape tension detection system (operates
in playback and record modes only)

Inputs: Two MIC inputs
Impedance: Low impedance
Maximum sensitivity: -72 dB (0.2 mV)

Two LINE Inputs
Impedance: 560 k Ω
Maximum sensitivity: -22 dB (60 mV)
REC/PB connector
Input impedance: 2 k Ω

Outputs: Two LINE OUTputs
Impedance: 10 k Ω or more
Output level: 0 dB (0.775 V) with
100 k Ω load

MONITOR output
Impedance: 10 k Ω or more
Accepts an 8 ohms earphone
Output level: 0 dB (0.775 V) with 10 k Ω load

PHONES jack
Impedance: 8 Ω
Output level: -30 dB (25 mV)

REC/PB connector
Output impedance: 8 k Ω
Load impedance: 50 k Ω

Battery Life: Long-life dry cell
Approximately 7.5 hours of continuous
recording by using built-in microphone
Rechargeable battery
Approximately 6.5 hours of continuous
recording by using built-in microphone
(charging time: approximately 24 hours)

Speaker: 10 cm (4") dynamic speaker
Voice coil impedance: 8 Ω

Semiconductors: 1 FET, 26 transistors and 9 diodes

Dimensions: 322(w) x 80(d) x 238(h) mm
12 11/16 (w) x 3 3/16 (d) x 9 3/8 (h) inches

Weight: 3.8 kg, 8 lb 7 oz (with battery)

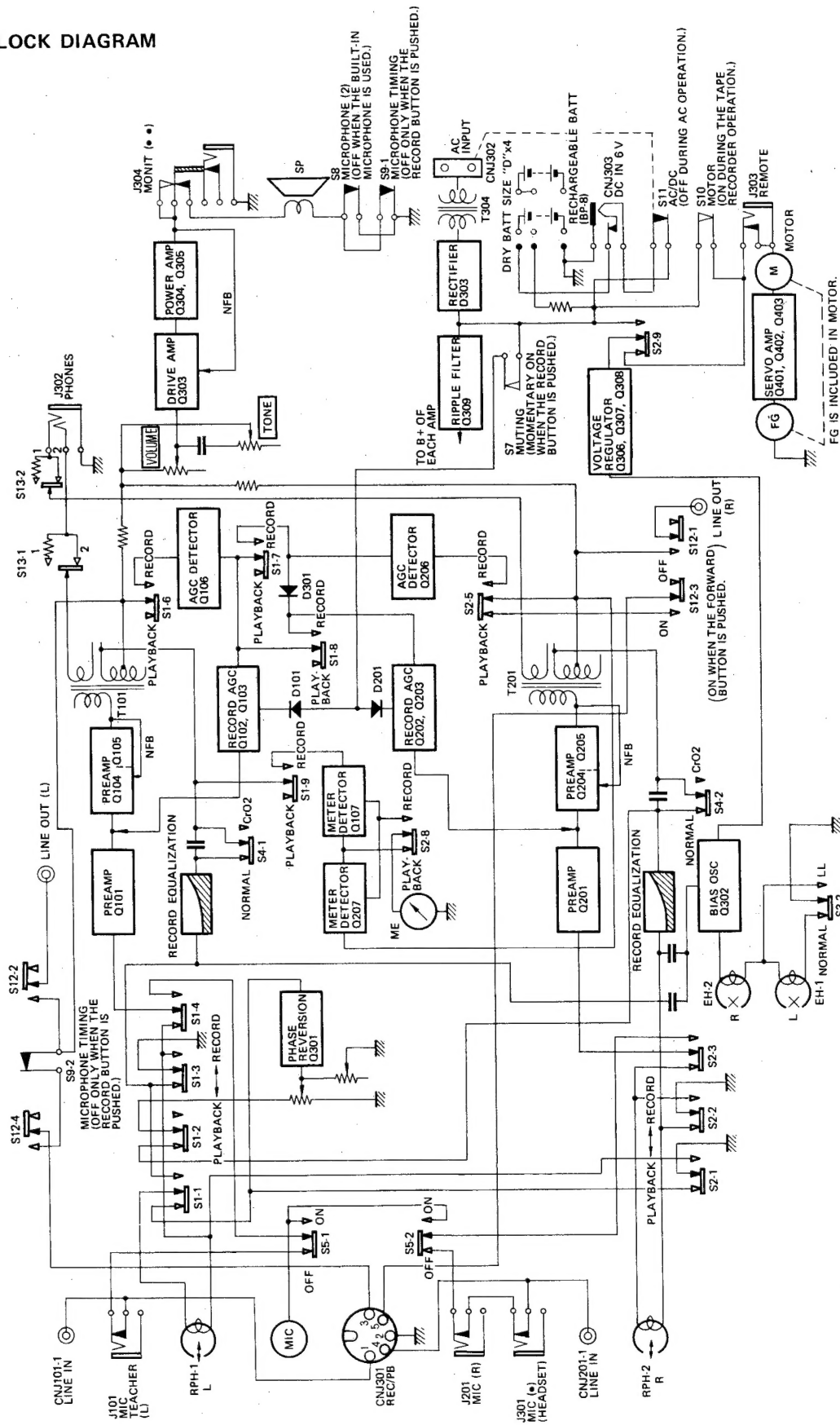
SONY®

SERVICE MANUAL

443

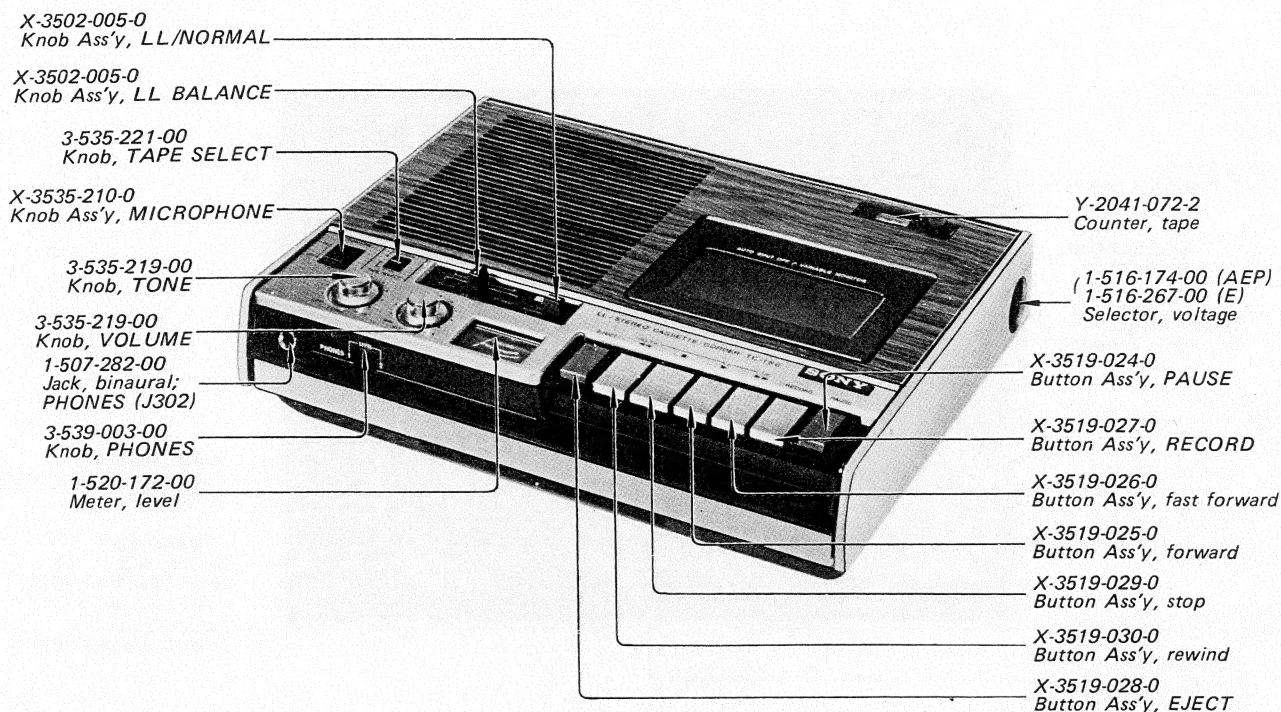
SECTION 1 OUTLINE

1-1. BLOCK DIAGRAM

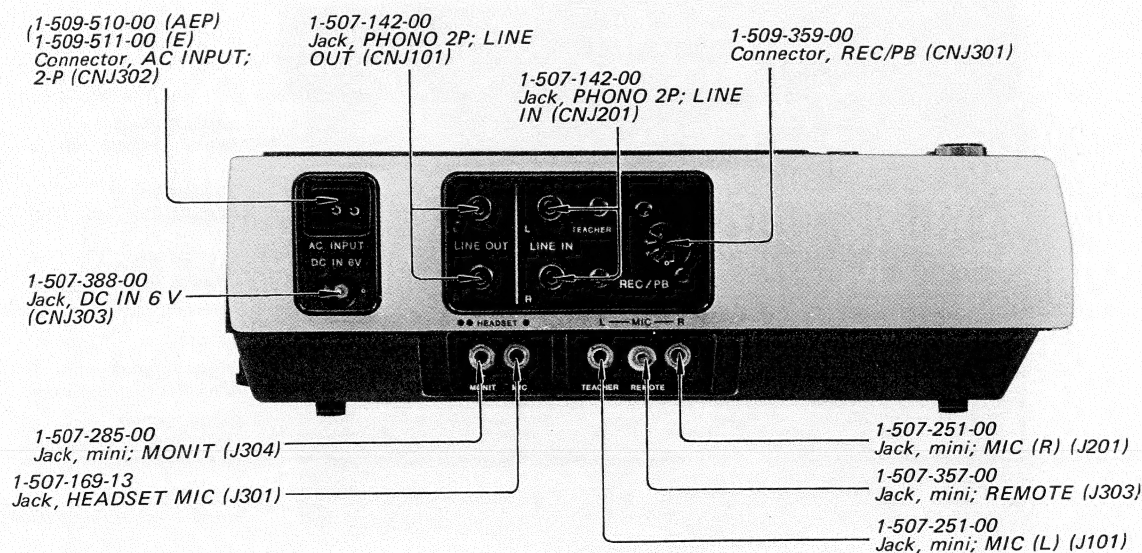


1-2. EXTERNAL VIEWS

(1)

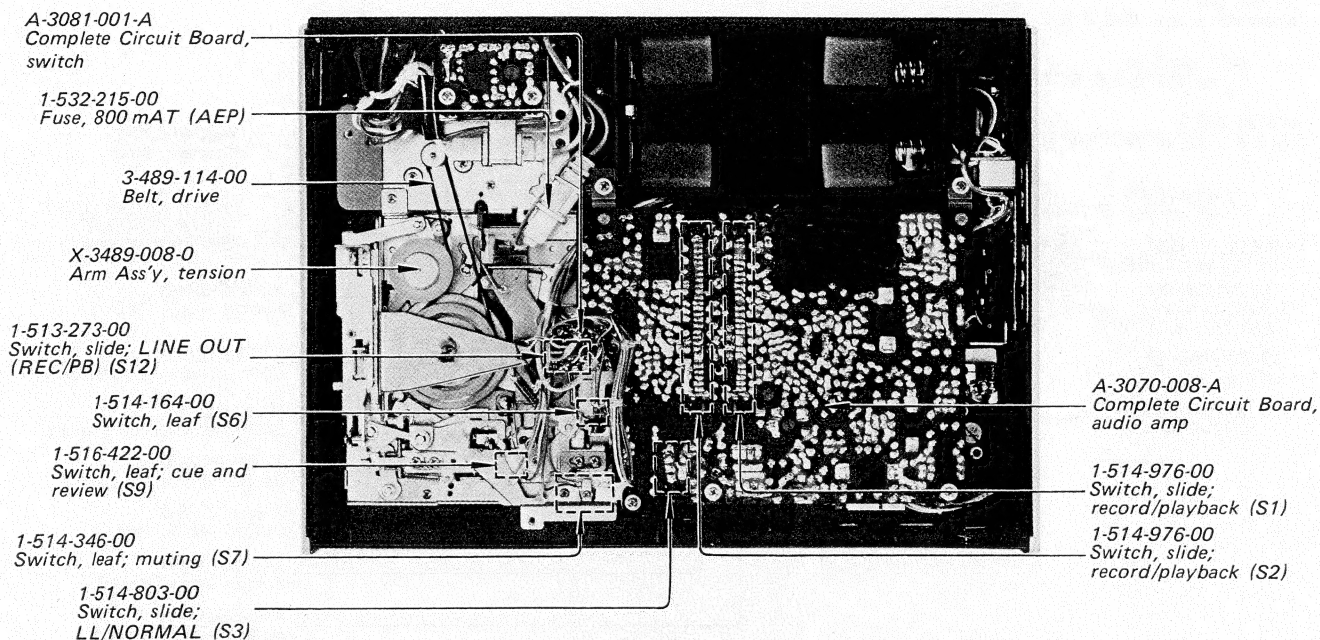


(2)

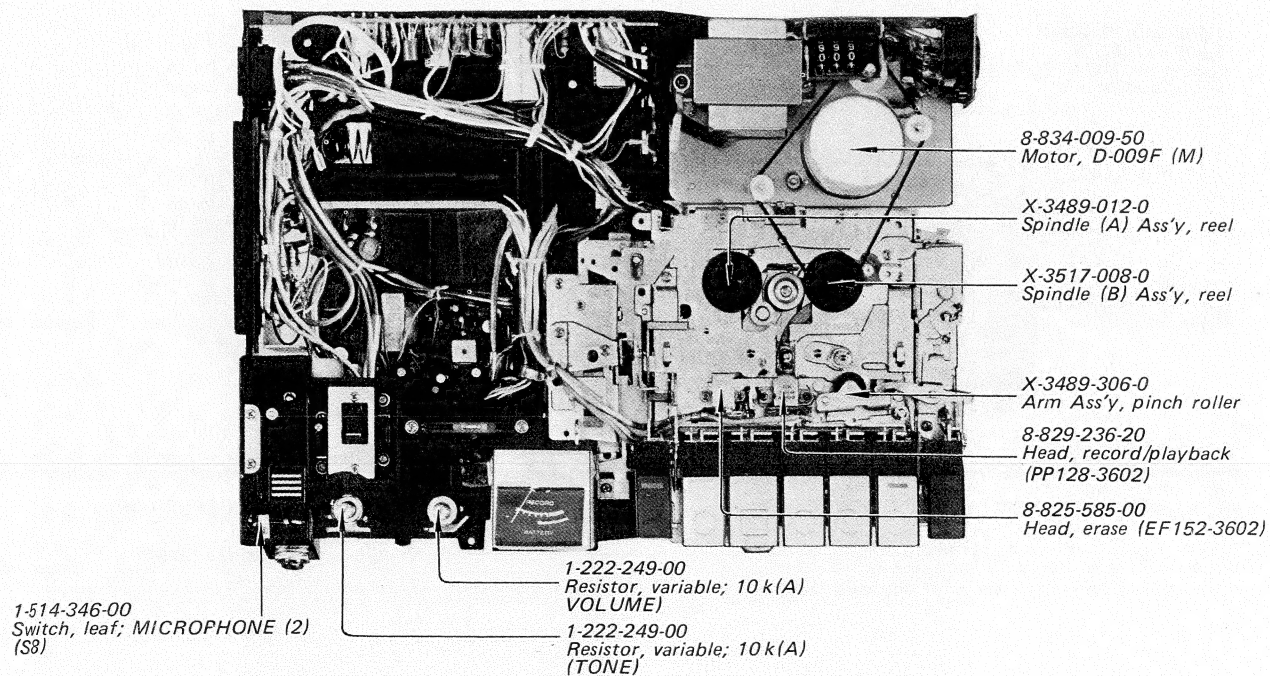


1.3. INTERNAL VIEWS

(1)



(2)

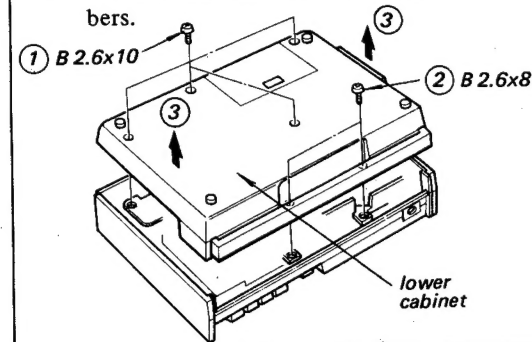


SECTION 2 DISASSEMBLY AND REPLACEMENT

Note: All screws are Phillips type (cross recess type) unless otherwise indicated.
(-): slotted head

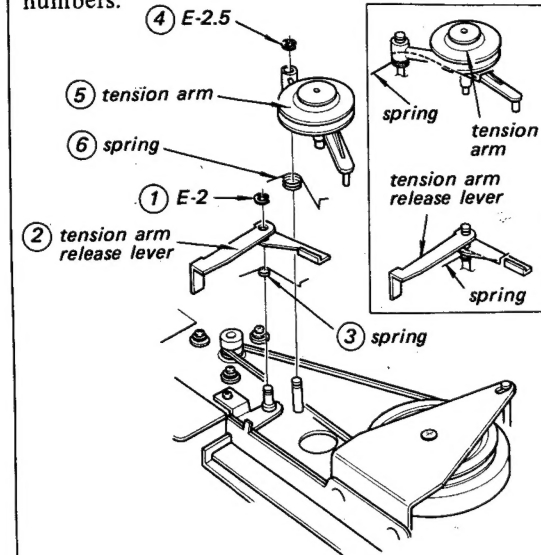
Lower Cabinet Removal

1. Take off the battery.
2. Remove the cabinet according to circled numbers.



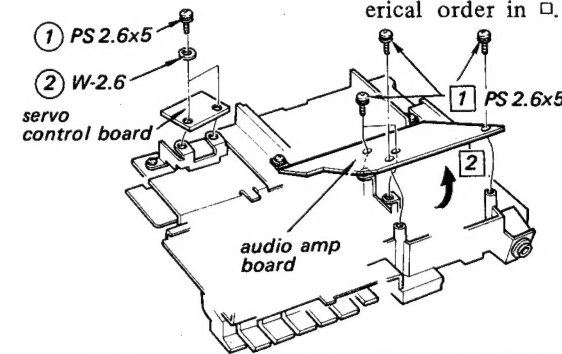
Tension Arm Removal

Remove the tension arm according to circled numbers.



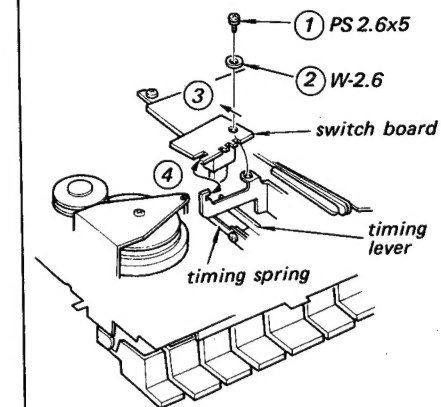
Complete Circuit Board Removal

Servo control circuit board ... Remove it by following in the numerical order in ○.
Audio amp circuit board ... Remove it by following in the numerical order in □.



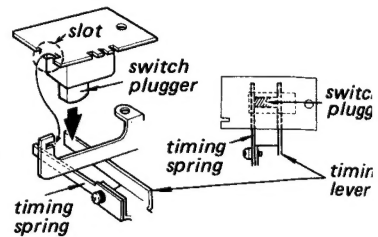
Switch Board Removal

Remove the switch board according to circled numbers.



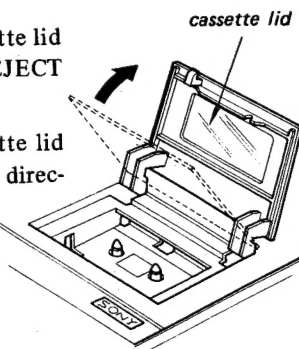
Switch Board Installation

1. Insert the switch plugger between timing lever and timing spring as shown.
2. Attach the switch board as shown.



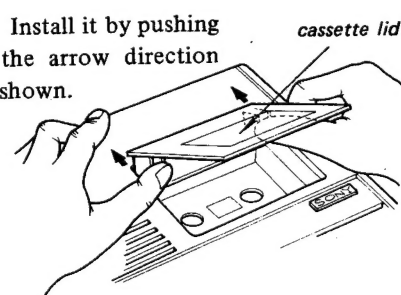
Cassette Lid Removal

1. Open the cassette lid by depressing EJECT button.
2. Push the cassette lid in the arrow direction as shown.



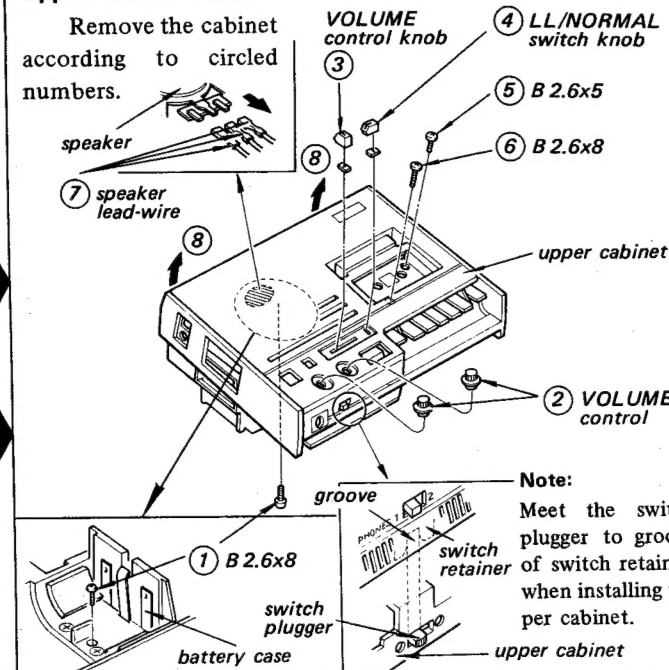
Cassette Lid Installation

Install it by pushing in the arrow direction as shown.



Upper Cabinet Removal

Remove the cabinet according to circled numbers.



Take-up Reel Spindle, Supply Reel Spindle, Motor and Idler Ass'y Removal

Motor ... Remove it in the numerical order in ○.

Supply

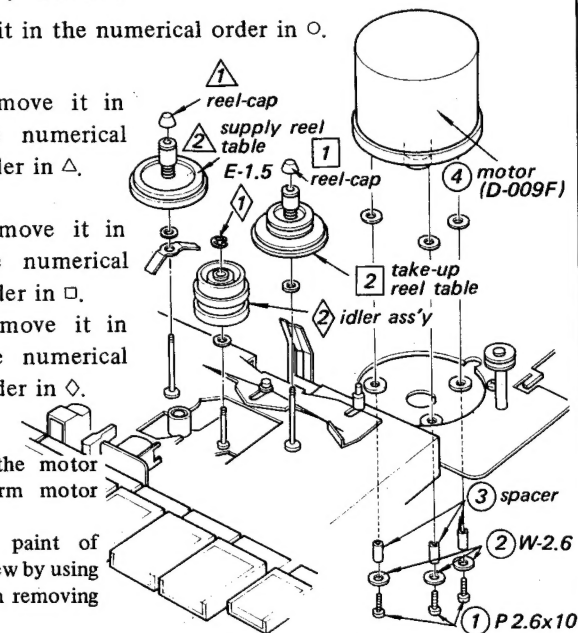
reel spindle ... Remove it in the numerical order in △.

Take-up reel spindle ... Remove it in the numerical order in □.

Idler Ass'y ... Remove it in the numerical order in ◇.

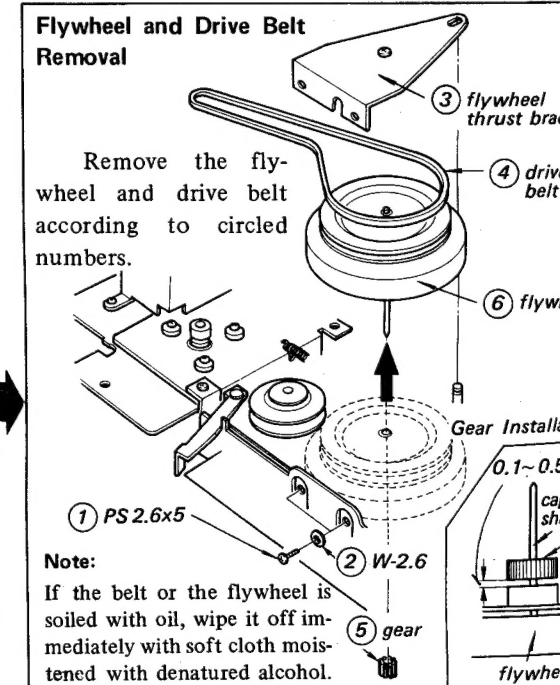
Note:

- 1) After completing the motor replacement, perform motor speed adjustment.
- 2) Remove the lock paint of motor pulley set-screw by using soldering iron, when removing motor pulley.



Flywheel and Drive Belt Removal

Remove the flywheel and drive belt according to circled numbers.

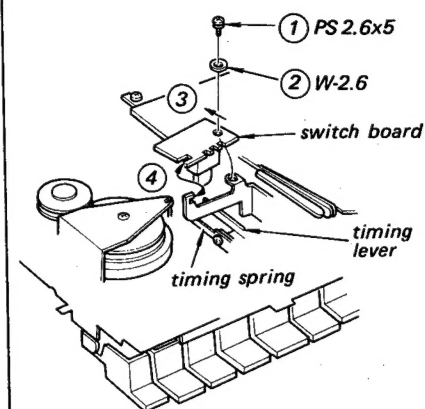
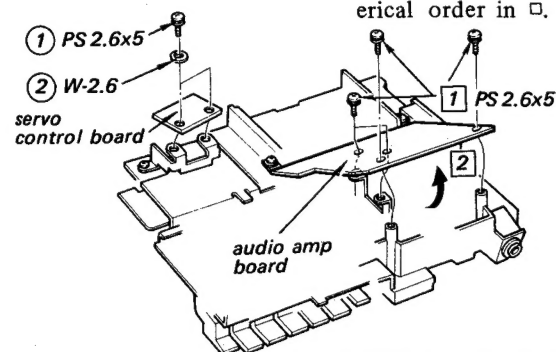


Note:

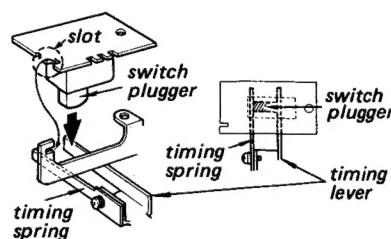
If the belt or the flywheel is soiled with oil, wipe it off immediately with soft cloth moistened with denatured alcohol.

Switch Board Removal

Switch Board Installation



1. Insert the switch plugger between timing lever and timing spring as shown.
2. Attach the switch board as shown.



Flywheel and Drive Belt Removal

Remove the fly-wheel and drive belt according to circled numbers.



Gear Installation

Note:
If the belt or the flywheel is soiled with oil, wipe it off immediately with soft cloth moistened with denatured alcohol.

Gear Installation

0.1~0.5 mm

capstan shaft

gear

flywheel

Note:

- 1) After completing the motor replacement, perform motor speed adjustment.
- 2) Remove the lock paint of motor pulley set-screw by using soldering iron, when removing motor pulley.

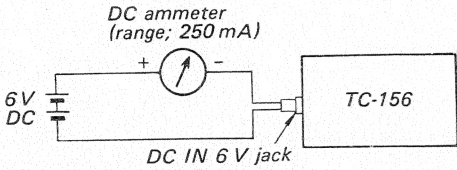
MEMO

SECTION 3
MECHANICAL ADJUSTMENTS

FLYWHEEL THRUST PLAY ADJUSTMENT

— Playback Mode —

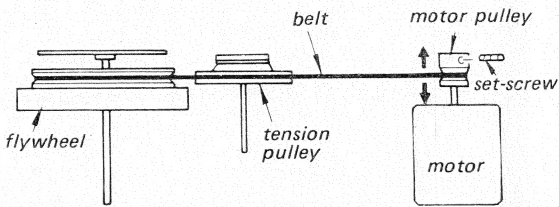
1. Loosen the thrust screw for sufficient flywheel play.
2. Tighten the screw until current suddenly increases, then loosen the screw 90 degrees.
3. Apply locking compound to the screw.



MOTOR PULLEY HEIGHT ADJUSTMENT

— Stop Mode —

Loosen the set-screw, and adjust the height of motor pulley so that belt is straight.

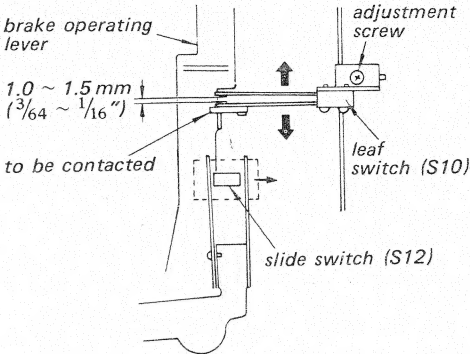


POWER SWITCH POSITION ADJUSTMENT

— Stop Mode —

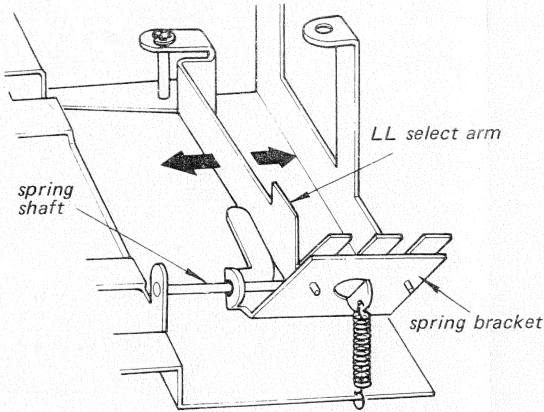
1. Loosen the adjustment screw, and adjust the position of leaf switch (S10) to have the specified contact separation.
2. When slowly depressing the forward button, check to see that the slide switch (S12) is switched over after leaf switch has been closed.

Note: After completing the adjustment, apply locking compound to adjustment screw.



LL SELECT ARM ADJUSTMENT

1. Switch the LL select lever to LL and NORMAL.
2. Adjust by bending the LL select arm so that the shaft-lengthwise play of the spring bracket is the same in LL mode and in NORMAL mode.

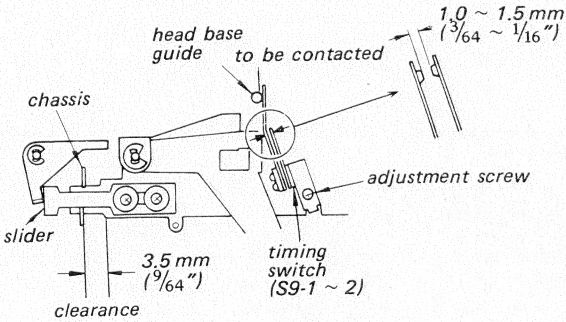


TIMING SWITCH POSITION ADJUSTMENT

— Stop Mode —

When slowly depressing the record button for the specified clearance, adjust the position of timing switch to have the specified contact separation.

Note: After completing the adjustment, apply locking compound to adjustment screw.

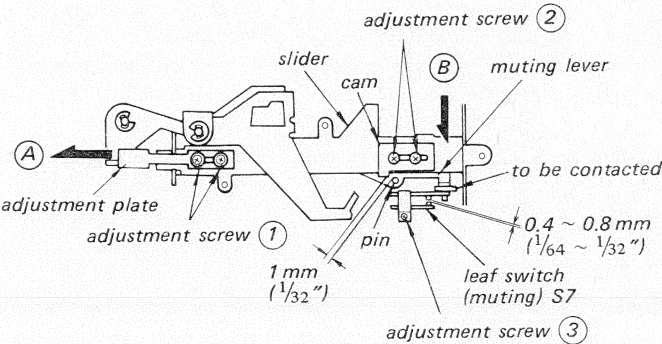


MUTING SWITCH POSITION ADJUSTMENT

— Stop Mode —

1. Push the adjustment plate to the full in the direction shown by the arrow (A), and tighten it with adjustment screws (1).
2. Loosen the adjustment screws (2), and adjust the position of cam for the specified clearance.
3. Loosen the adjustment screw (3), and adjust the position of leaf switch (S7) while pushing the slider in the direction shown by the arrow (B) so that muting lever pushes the leaf switch to have the specified contact separation.

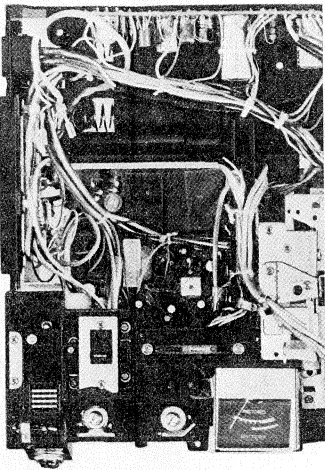
Note: After completing the adjustment, apply locking compound to adjustment screws (1), (2), and (3).



PINCH ROLLER PRESSURE MEASUREMENT

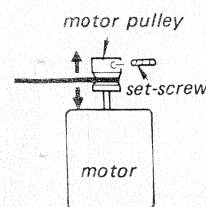
— Playback Mode —

1. Check to see that capstan is parallel to pinch roller.
2. Push pinch roller away from the capstan using tension gauge, as shown by the arrow (A). Allow pinch roller to return slowly. The pressure (tension) should be measured at the point where the pinch roller just contacts the capstan. If necessary, adjust pinch roller pressure by bending spring.



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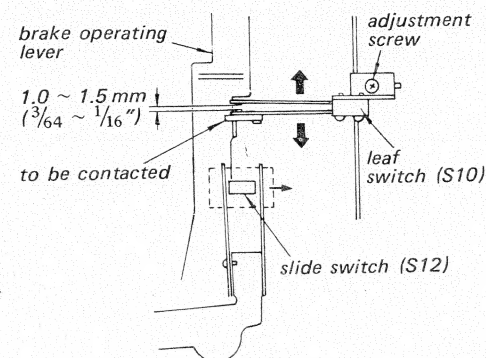


POWER SWITCH POSITION ADJUSTMENT

— Stop Mode —

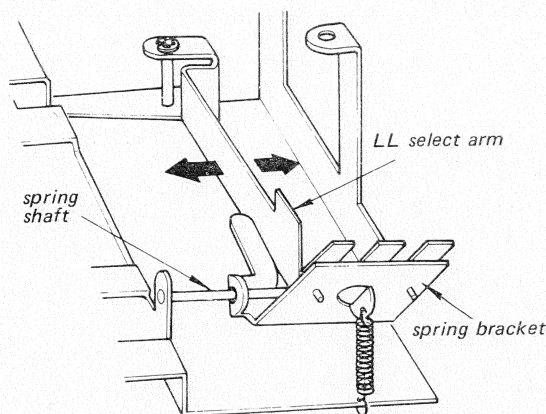
1. Loosen the adjustment screw, and adjust the position of leaf switch(S10) to have the specified contact separation.
2. When slowly depressing the forward button, check to see that the slide switch(S12) is switched over after leaf switch has been closed.

Note: After completing the adjustment, apply locking compound to adjustment screw.



LL SELECT ARM ADJUSTMENT

1. Switch the LL select lever to LL and NORMAL.
2. Adjust by bending the LL select arm so that the shaft-lengthwise play of the spring bracket is the same in LL mode and in NORMAL mode.

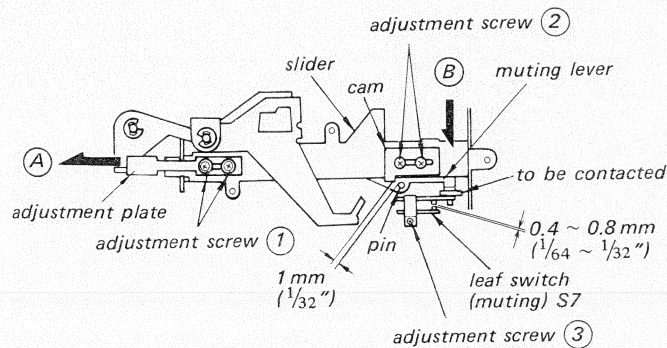


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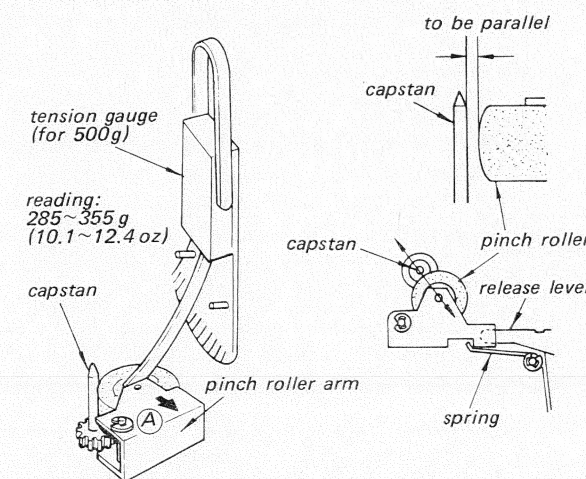
it, apply
it screws



PINCH ROLLER PRESSURE MEASUREMENT

— Playback Mode —

1. Check to see that capstan is parallel to pinch roller.
2. Push pinch roller away from the capstan using tension gauge, as shown by the arrow A. Allow pinch roller to return slowly. The pressure (tension) should be measured at the point where the pinch roller just contacts the capstan. If necessary, adjust pinch roller pressure by bending spring.



Fast Forward, Forward and Rewind Torque

| Mode | Torque meter | Meter reading |
|--------------|--------------|---------------|
| Forward | * CQ101 | 30 ~ 50 g·cm |
| Fast Forward | * CQ201 | 60 ~ 140 g·cm |
| Rewind | | |

* SONY cassette type torque meter

| Model | Part No. |
|-------|--------------|
| CQ101 | Y-20926-01-1 |
| CQ201 | Y-20926-11-1 |

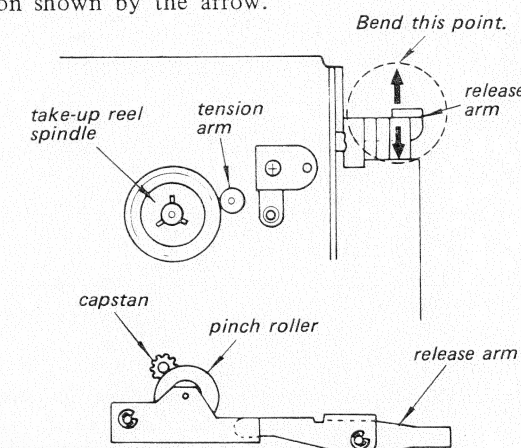
PAUSE TIMING CHECK

— Playback Mode —

1. When depressing the PAUSE button, check to see that
 - a) pinch roller releases from capstan.
 - b) tension arm releases from take-up reel spindle.
2. When releasing the PAUSE button, check to see that
 - a) tension arm contacts take-up reel spindle.
 - b) pinch roller contacts capstan.

Note: Above functions a) and b) may be found in the same time.

If necessary, bend the release arm in the direction shown by the arrow.



SECTION 4

ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

PRECAUTION

1. Clean the following parts with alcohol moistened swab:
 - Record/playback head
 - Erase head
 - Capstan
 - Pinch roller
 - Rubber belts
 - Idlers
2. Demagnetize record/playback head with a head demagnetizer.
(Do not use magnetized screwdriver for adjustments).
3. After completing the adjustments, apply locking compound to adjustment parts.
4. Adjustments should be performed in the order listed in this service manual.
5. Adjustments and measurements should be performed with rated power supply voltage unless otherwise specified.

Test Equipment/Tools Required

audio oscillator (af osc)
 VTVM
 DC ammeter
 DC voltmeter
 monaural cassette-corder for chromium dioxide tape
 digital frequency counter
 or speed checker (SONY LFM-30)
 400 Hz bandpass filter
 resistors 300 Ω , 600 Ω , 100 k Ω , 8 Ω (4 W)
 attenuator
 wow meter
 distortion meter
 SONY test tapes
 P-4-A81 (6.3 kHz, -10 dB)
 P-4-L81 (333 Hz, 0 dB)
 SPC-4 (1 kHz, 0 dB)
 WS-48 (3 kHz, 0 dB)
 blank tape cassette (completely erased)
 normal
 chromium dioxide

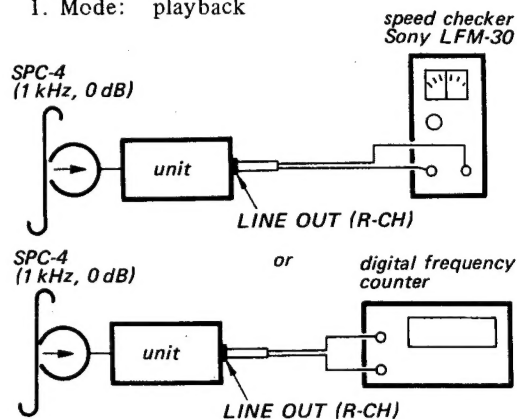
1. Tape Speed Adjustment

Settings:

LL/NORMAL switchNORMAL
 TAPE SELECT switchNORMAL
 Power source6V DC

Procedure:

1. Mode: playback



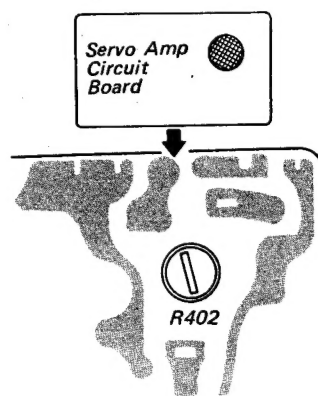
Adjust R402 for 1000 Hz reading on the frequency counter or for 0 % on the speed checker.

Specifications:

1.

| Speed checker | Digital frequency counter |
|---------------|---------------------------|
| -2.5 ~ +3% | 975 ~ 1030 Hz |
2. Frequency difference between beginning and end of tape should be within 1% (10 Hz).

Adjustment Location:



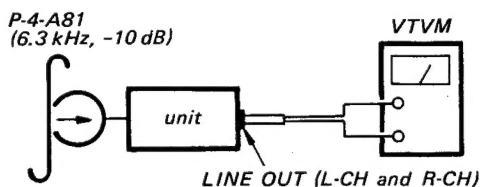
2. Record/Playback Head Azimuth Adjustment

Settings:

LL/NORMAL switchNORMAL
TAPE SELECT switchNORMAL

Procedure:

1. Mode: playback



Adjust the adjusting screw (Fig. B) to obtain maximum reading on the VTVM.

Notes:

- a) A few peaks may appear as illustrated in Fig. A, take the biggest peak.
- b) If the peak values for L-CH and R-CH are not obtained in the same azimuth angle, take the mid angle between them and the deviation should be within 1 dB.

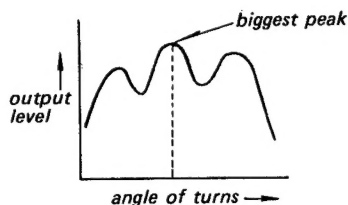


Fig. A

Adjustment Location:

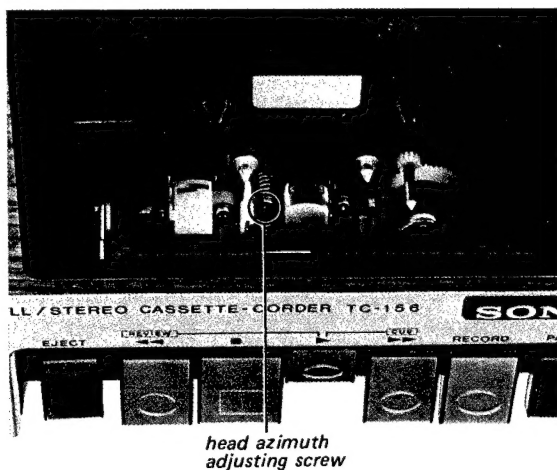


Fig. B

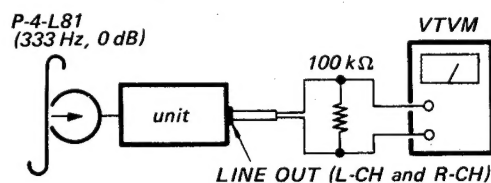
3. Playback Level Adjustment

Settings:

LL/NORMAL switchNORMAL
TAPE SELECT switchNORMAL

Procedure:

1. Mode: playback



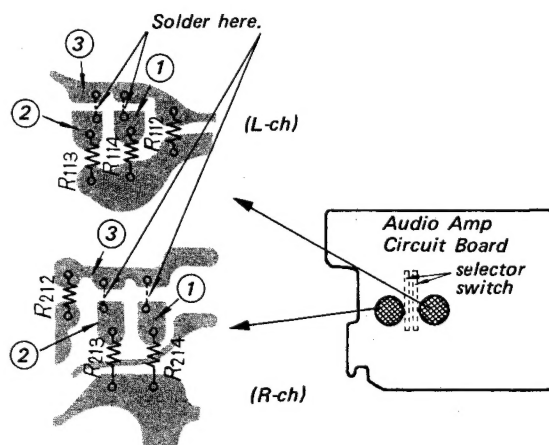
Select the resistor R113, R213 and R114, R214 for 2 dB (0.95 V) reading on the VTVM.

Note: In case the LINE OUTput level is higher than the specified value, solder the point ② and ③.
In case the LINE OUTput level is lower than the specified value, solder the point ① and ③.

Specifications:

- (1) 2 dB \pm 2 dB (0.775 ~ 1.2 V)
- (2) Level difference between L-CH and R-CH should be within 3 dB.

Adjustment Location:



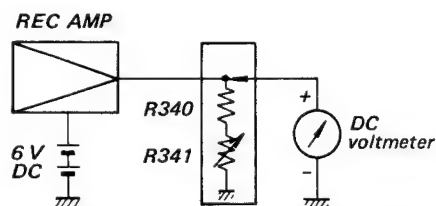
4. B+ Voltage Adjustment for Record Bias Oscillator

Settings:

LL/NORMAL switch.....NORMAL
TAPE SELECT switch.....NORMAL

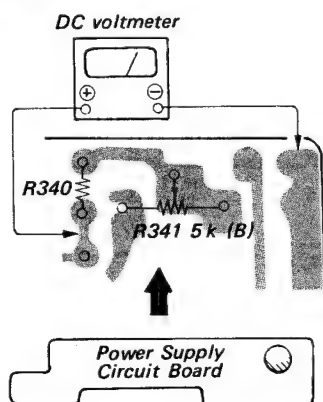
Procedure:

1. Mode: record



Adjust R341 for $4.5\text{ V} \pm 0.1\text{ V}$ reading on the voltmeter.

Adjustment Location:



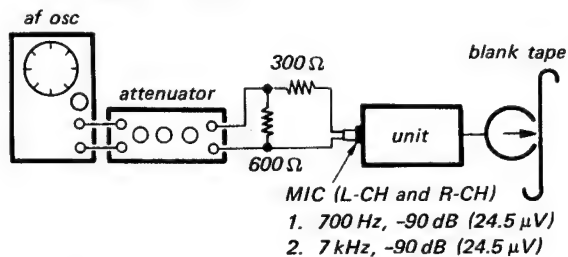
5. Record Bias Adjustment

Settings:

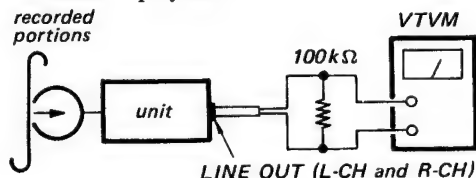
LL/NORMAL switch.....NORMAL
TAPE SELECT switch.....NORMAL

Procedure:

1. Mode: record



2. Mode: playback



Be sure that the level difference between 7 kHz signal and 700 Hz signal is within the specified value.

Specifications:

| (1) | Frequency | Level Difference |
|-----|-----------|---------------------------|
| | 700Hz | |
| | 7 kHz | 0 dB $\pm \frac{3}{4}$ dB |

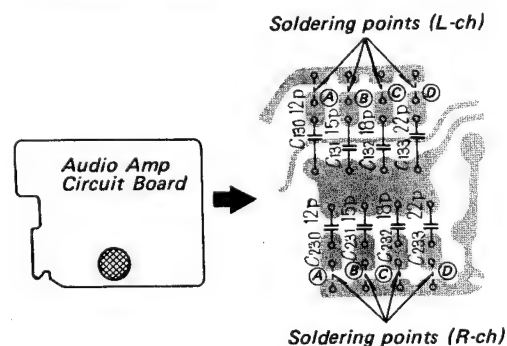
- (2) Level difference between the L-CH and R-CH should be within 3 dB.

Note: If necessary, adjust by soldering points (A), (B), (C) or (D).

In case the output level at 7 kHz is higher than at 700 Hz, increase capacitance value.

In case the output level at 7 kHz is lower than at 700 Hz, decrease capacitor capacitance value.

Adjustment Location:



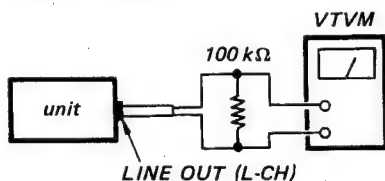
6. Trap Coil Adjustment

Settings:

LL/NORMAL switch.....LL
TAPE SELECT switch.....NORMAL

Procedure:

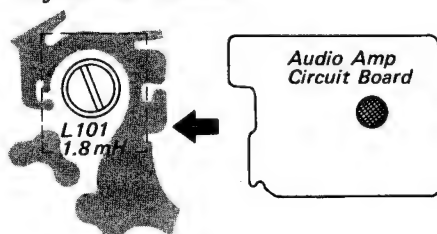
1. Mode: record



Adjust the coil L101 for minimum reading on the VTVM.

Specification: less than -20 dB (77 mV)

Adjustment Location:



7. Battery Indicator Calibration

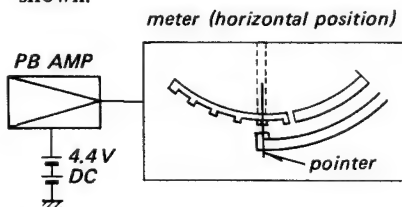
Settings:

TONE control.....HIGH max
VOLUME control.....MIN
Power source.....4.4 V DC

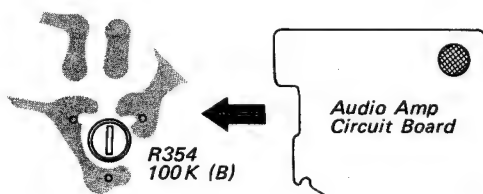
Procedure:

1. Mode: playback

Adjust R354 so that pointer indicates as shown.

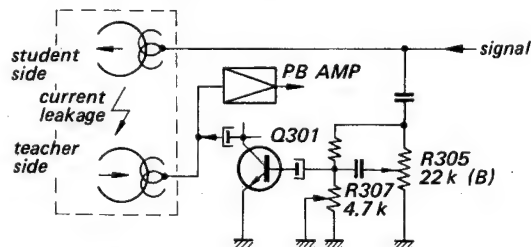


Adjustment Location:



8. Cross Talk Canceling Adjustment

Note: The purpose of this adjustment is to cancel current leakage from student side (record) to teacher side (playback).

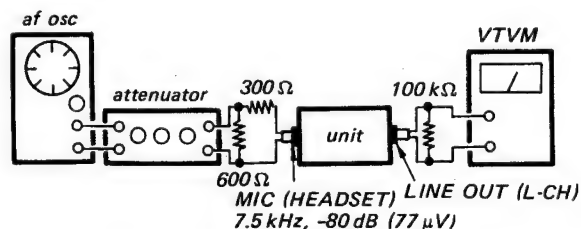


Settings:

LL/NORMAL switch.....LL
TAPE SELECT switch.....NORMAL

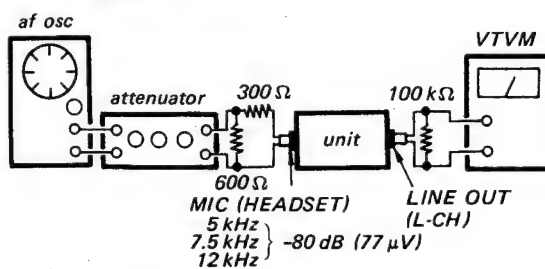
Procedure:

1. Mode: record



Adjust R305 and R307 for minimum reading on the VTVM.

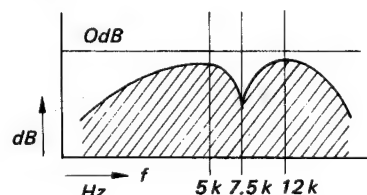
2. Mode: record



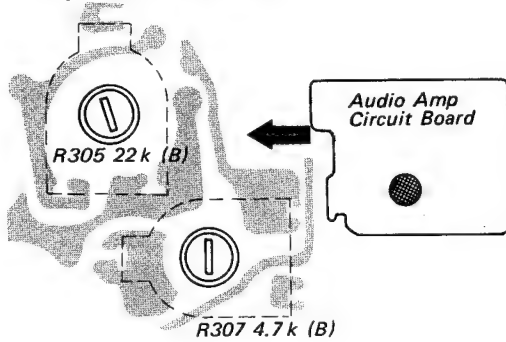
Be sure that the LINE OUTput level is within the specified value.

Specifications:

- a) less than 0 dB (0.775 V) at 5 kHz and 12 kHz signals
- b) less than -5 dB (0.44 V) at 7.5 kHz signal.



Adjustment Location:



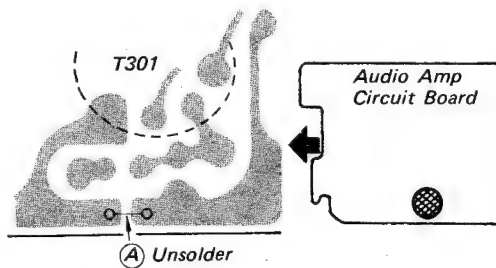
9. AGC Stereo Balance Adjustment

Settings:

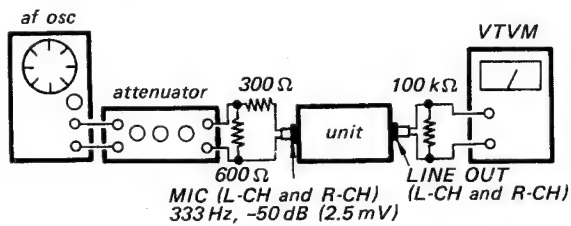
LL/NORMAL switch NORMAL

Procedure:

1. Unsolder the point (A).



2. Mode: record



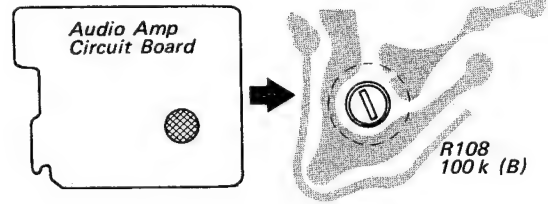
Adjust R108 to obtain the same output level for both L-CH and R-CH.

Specifications:

- a) 2.5 dB \pm 2 dB (0.82 ~ 1.3 V)
- b) level difference between the L-CH and R-CH should be within 0.5 dB.

3. After completing the adjustment, solder the point (A).

Adjustment Location:



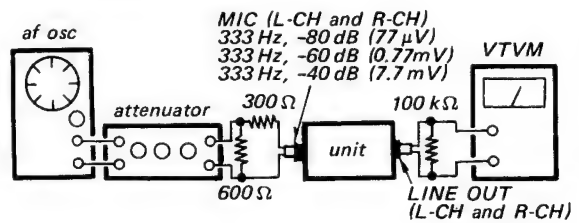
10. AGC Level Measurement

Settings:

LL/NORMAL switch NORMAL

Procedure:

1. Mode: record



Be sure that LINE OUTput level is as specified.

Specifications:

| MIC input level | LINE OUTput level |
|---------------------|--|
| -80 dB (77 μ V) | -8 dB \pm 2 dB (0.25 ~ 0.39 V) |
| -60 dB (0.77 mV) | 1 dB \pm 2 dB (0.69 ~ 1.1 V) |
| -40 dB (7.7 mV) | 4 dB \pm $\frac{3}{2}$ dB (0.95 ~ 1.7 V) |

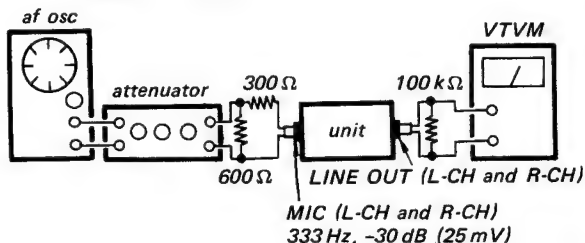
11. AGC Recovery Time Measurement

Settings:

LL/NORMAL switch NORMAL

Procedure:

1. Mode: record



2. Suddenly decrease the input signal to -60 dB (0.77 mV).
3. Measure the recovery time while the output level increases 10 dB from -30 dB (25 mV) to -20 dB (77 mV).

Specification: 20 to 120 seconds

12. Playback Signal-to-Noise Ratio Measurement

Settings:

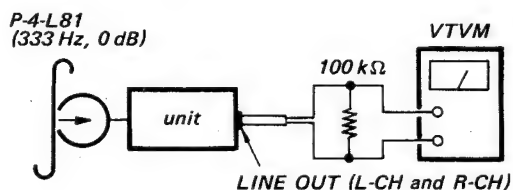
LL/NORMAL switch NORMAL

TAPE SELECT switch NORMAL

Power source 6 V DC and rated AC voltage

Procedure:

1. Mode: playback



2. Read the L-CH and R-CH LINE OUTPUT levels on the VTVM.
3. When depress the PAUSE button, read the noise level on the VTVM, and make sure that difference between the noise level and the level at step 2.

Specifications:

- (1) greater than 46 dB with battery.
- (2) greater than 42 dB with household current.

13. Overall Signal-to-Noise Ratio Measurement

Settings:

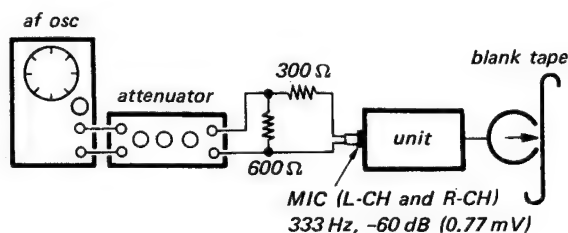
LL/NORMAL switch NORMAL

TAPE SELECT switch NORMAL

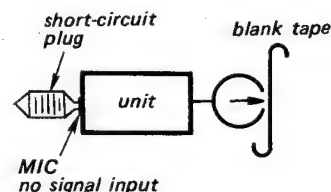
Power source 6 V DC and rated AC voltage

Procedure:

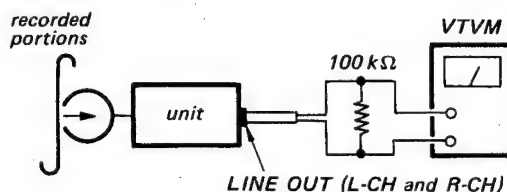
1. Mode: record



2. Mode: record



3. Mode: playback



Make sure that the level difference between the 333 Hz and no signal portions are as specified.

Specifications:

- (1) greater than 45 dB with battery
- (2) greater than 40 dB with household current.

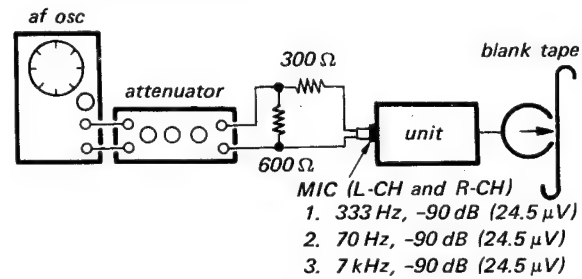
14. Overall Frequency Response Measurement

Settings:

LL/NORMAL switch NORMAL
TAPE SELECT switch NORMAL
or CrO₂

Procedure:

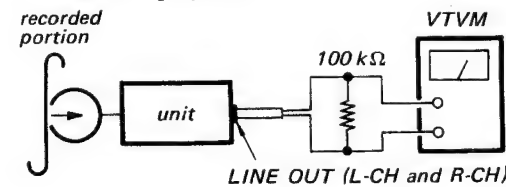
1. Mode: record



Note: Use blank tape as follows;

| TAPE SELECT switch | Using cassette tape |
|--------------------|---------------------|
| NORMAL | normal |
| CrO ₂ | chromium dioxide |

2. Mode: playback



Be sure that the level deviation of each frequency relative to 333 Hz signal is as specified.

Specifications:

| Mode | TAPE SELECT switch mode | Record signal | Playback LINE OUT signal |
|-----------------|-------------------------|---------------|--------------------------------|
| NORMAL record | NORMAL | 70 Hz | 0 dB ± 0 dB (0.19~0.775 V) |
| | | 7 kHz | 0 dB ± 2 dB (0.49~0.95 V) |
| NORMAL playback | CrO ₂ | 7 kHz | 0 dB ± 4 dB (0.55~1.1 V) |
| LL record | NORMAL | 70 Hz | 0 dB ± 15 dB (0.14~0.775 V) |
| LL playback | | 7 kHz | 0 dB ± 2 dB (0.39~0.95 V) |

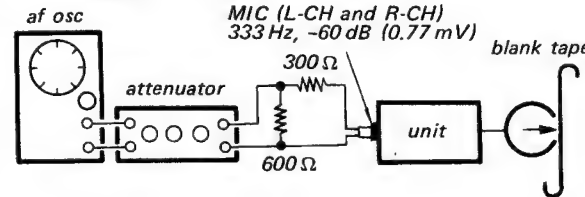
15. Overall Distortion Measurement

Settings:

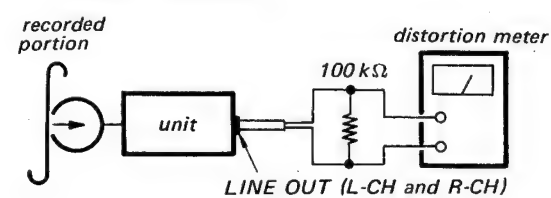
LL/NORMAL switch NORMAL
TAPE SELECT switch NORMAL

Procedure:

1. Mode: record



2. Mode: playback



Measure the distortion.

Specification: less than 4%

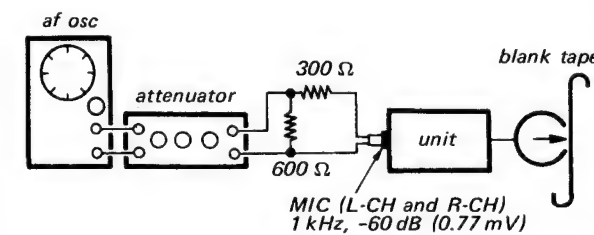
16. Overall Maximum Output Measurement

Settings:

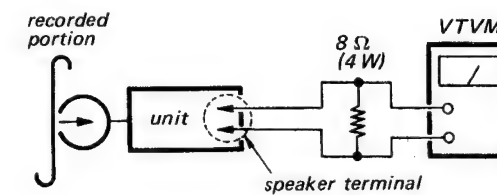
LL/NORMAL switch NORMAL
TAPE SELECT switch NORMAL
TONE control HIGH max
VOLUME control MAX
Power supply 6 V DC and
rated AC
power voltage

Procedure:

1. Mode: record



2. Mode: playback



Measure the output level.

Specification:

| Power Supply | Output Level |
|--------------|----------------------------|
| DC | more than 11 dB (2.8 V) |
| AC | more than 10 dB (2.5 V) |

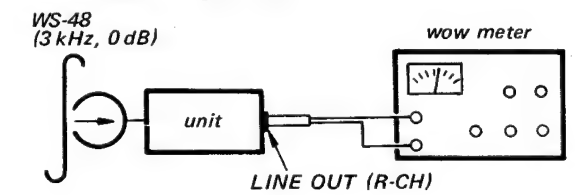
17. Wow and Flutter Measurement

Settings:

LL/NORMAL switch NORMAL
TAPE SELECT switch NORMAL

Procedure:

1. Mode: playback



Measure wow and flutter for beginning and end portions of tape (WS-48).

Specification: less than 0.34% (RMS)

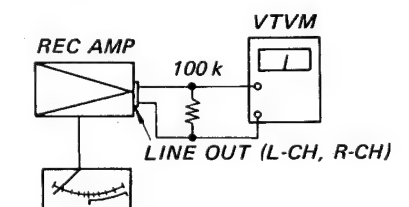
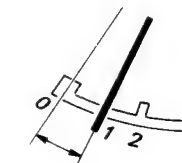
18. Bias Current Leakage Measurement

Settings:

MICROPHONE switch OFF

Procedure:

1. Mode: record (No signal)



Be sure that the L-CH and R-CH LINE OUTput levels are as specified.

Specifications:

- a) less than -12 dB (0.19 V)
- b) The level meter indication should be within "1" on the scale.

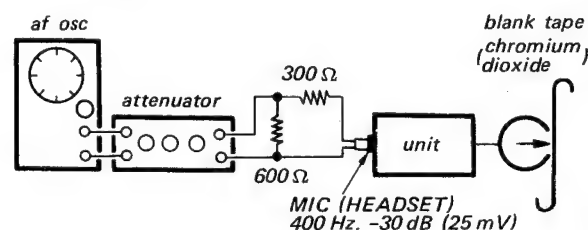
19. Erase Ratio Measurement (1)

Settings:

LL/NORMAL switch.....LL
TAPE SELECT switch.....CrO₂
LL BALANCE control.....STUDENT
max

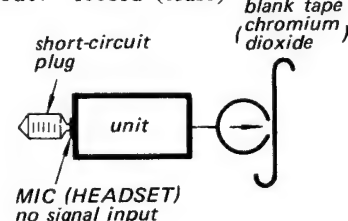
Procedure:

1. Mode: record

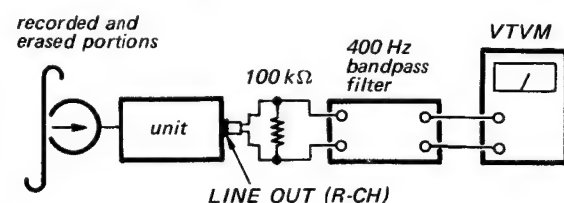


2. Rewind a half of the signal recorded portion of the tape cassette.

3. Mode: record (erase)



4. Mode: playback



Make sure that the level difference between two portions is as specified.

Specification: 60 dB or more

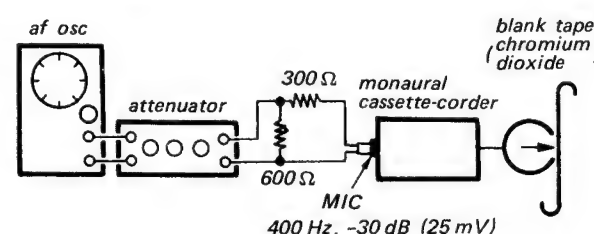
20. Erase Ratio Measurement (2)

Settings:

LL/NORMAL switch.....NORMAL
TAPE SELECT switch.....CrO₂
Prepare a monaural cassette-corder using chromium dioxide tape.

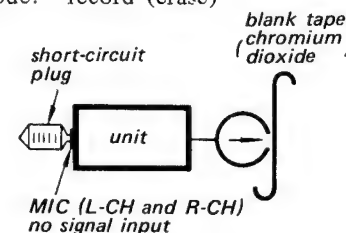
Procedure:

1. Mode: record

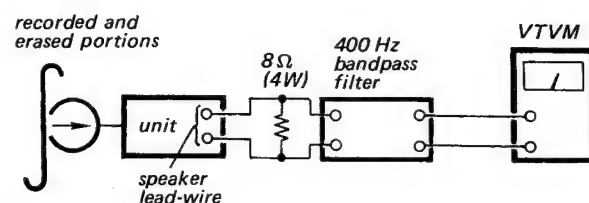


2. Rewind a half of the signal recorded portion of the tape cassette.

3. Mode: record (erase)



4. Mode: playback



Adjust the VOLUME control at signal recorded portion for 0 dB (0.775 V) reading on the VTVM, and make sure that level difference between two portions is as specified.

Specification: 60 dB or more

21. Teacher Channel Erasure Measurement

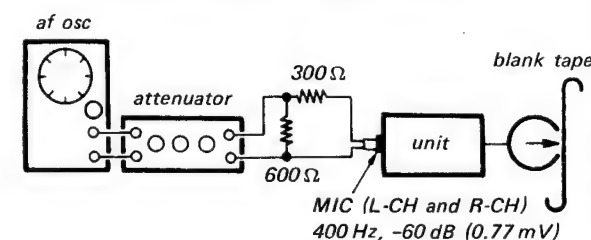
In LL record mode, the student channel is in record mode and the teacher channel in playback mode. The teacher channel is slightly erased by the erase head of the student channel. This measurement is to know how much erased the teacher channel is by adjacent erase head.

Settings:

TAPE SELECT switch.....NORMAL

Procedure:

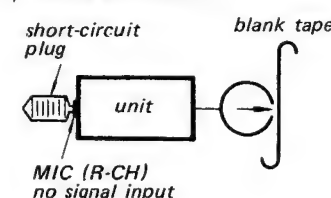
1. Mode: record
LL/NORMAL switch: NORMAL



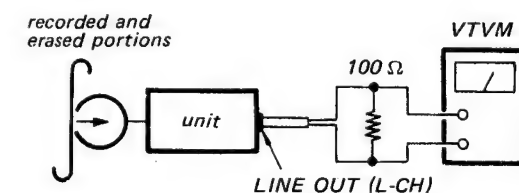
2. Rewind a half of the signal recorded portion of tape cassette.

3. Mode: record (erase)

LL/NORMAL switch: LL



4. Mode: playback



Make sure that the level difference between two portions is as specified.

Specification: less than 2 dB

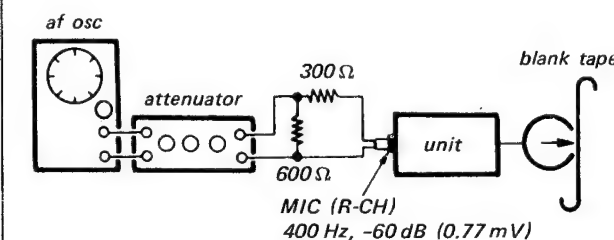
22. Cross Talk (Between Channels) Measurement

Settings:

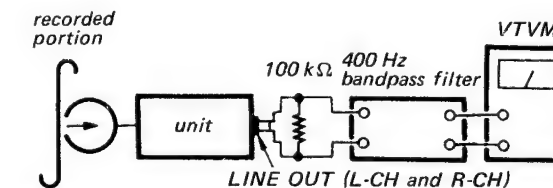
LL/NORMAL switch.....LL
TAPE SELECT switch.....NORMAL

Procedure:

1. Mode: record



2. Mode: playback



- a) Move the LL BALANCE control fully to STUDENT, and read the VTVM indication at R-CH LINE OUT.

- b) Move the LL BALANCE control fully to TEACHER, and read the VTVM indication at L-CH LINE OUT.

Make sure that the level difference between step a) and step b) is as specified.

Specification: 25 dB or more

SECTION 5 DIAGRAMS

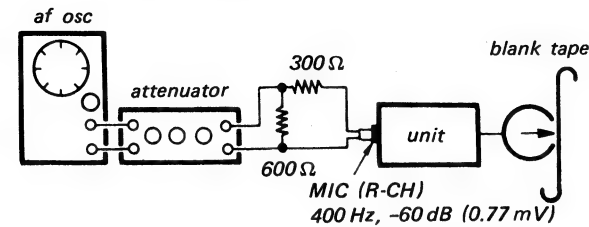
23. Cross Talk (Between Tracks) Measurement

Settings:

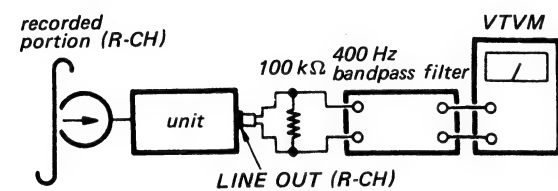
LL/NORMAL switch.....NORMAL
TAPE SELECT switch.....NORMAL

Procedure:

1. Mode: record



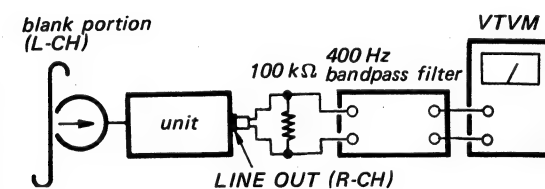
2. Mode: playback



Read the VTVM indication.

3. Mode: playback

Note: Turn over the tape cassette.



Read the VTVM indication.

4. Make sure that the level difference between step 2 and step 3 is as specified.

Specification: 55 dB or more

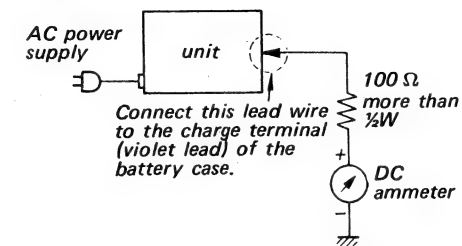
24. Charge Current Check

Settings:

POWER switchOFF

Procedure:

1. Test Setup

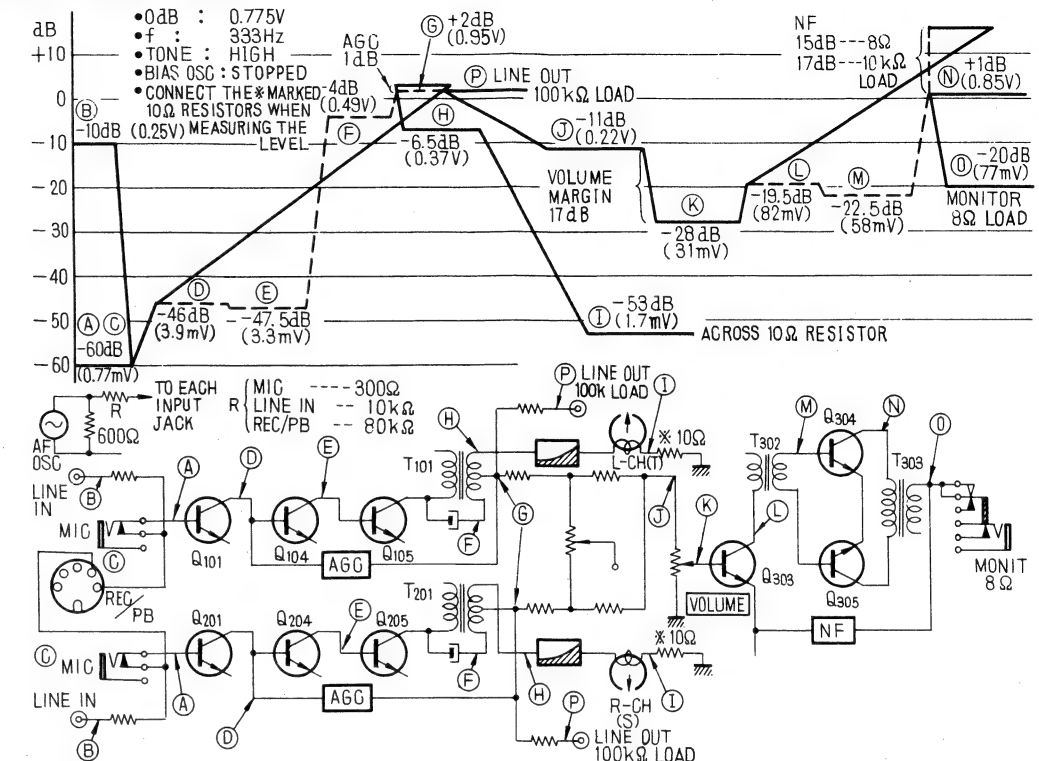


2. Make sure that the reading is as specified.

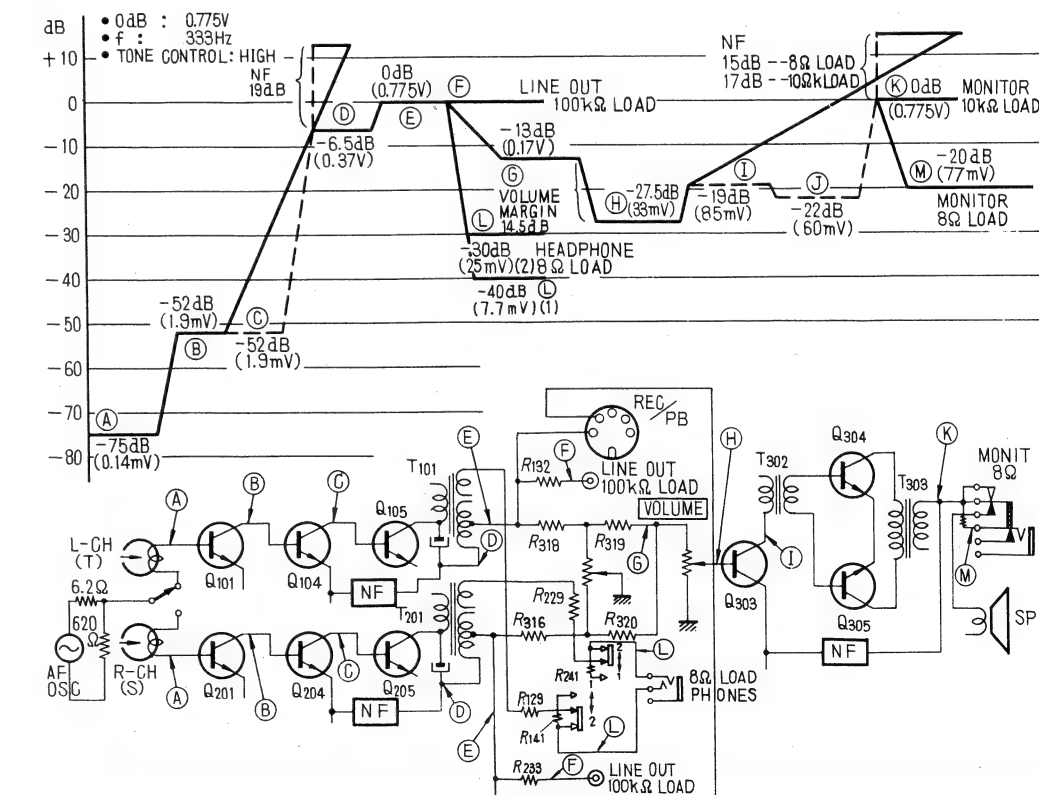
Specification: 45 ~ 75 mA.

5-1. LEVEL DIAGRAM

— NORMAL Record Mode —



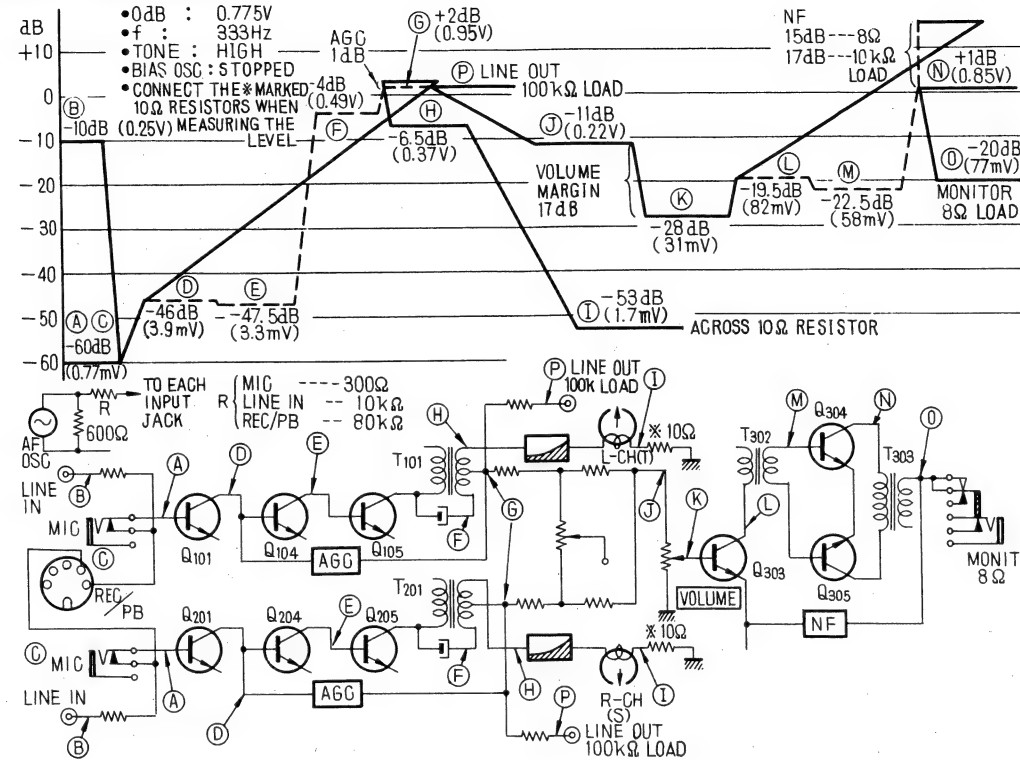
— Playback Mode —



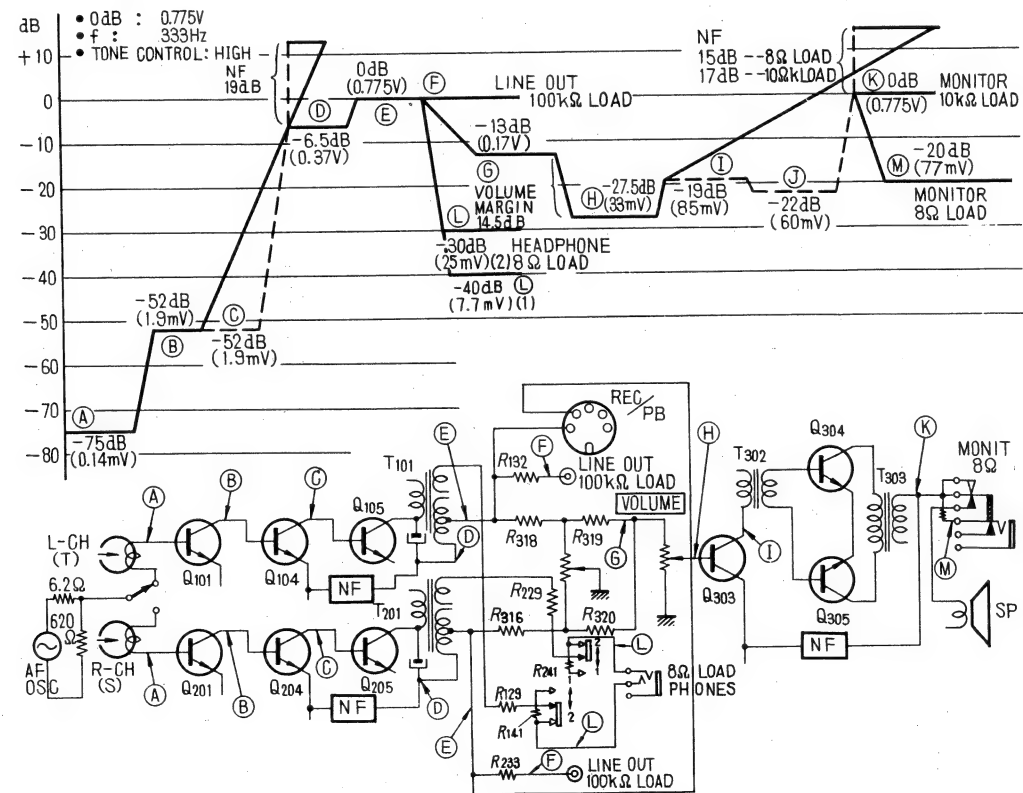
SECTION 5 DIAGRAMS

5-1. LEVEL DIAGRAM

— NORMAL Record Mode —



— Playback Mode —



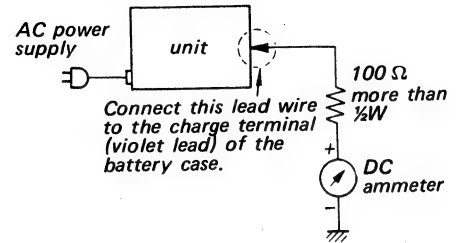
24. Charge Current Check

Settings:

POWER switch OFF

Procedure:

1. Test Setup

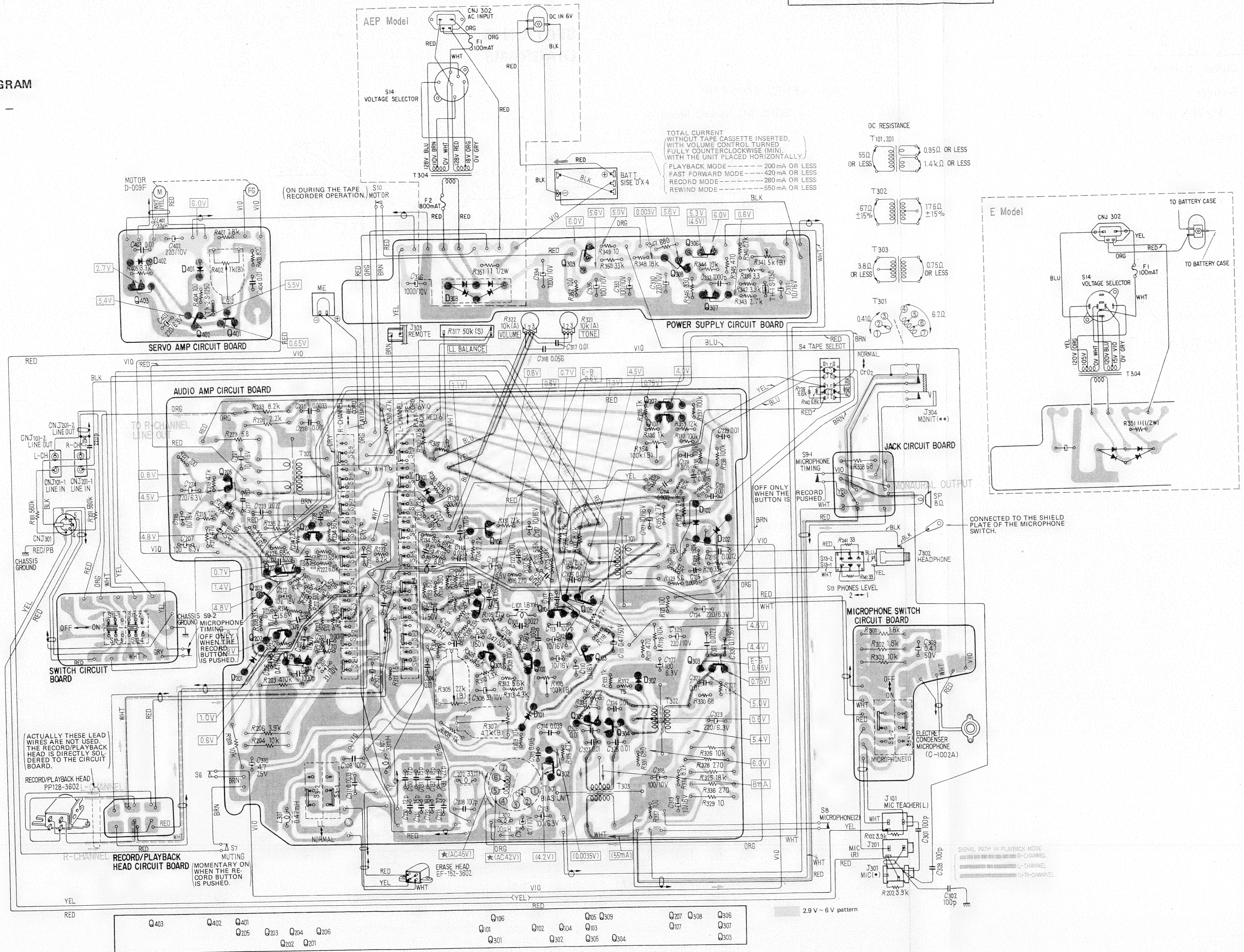


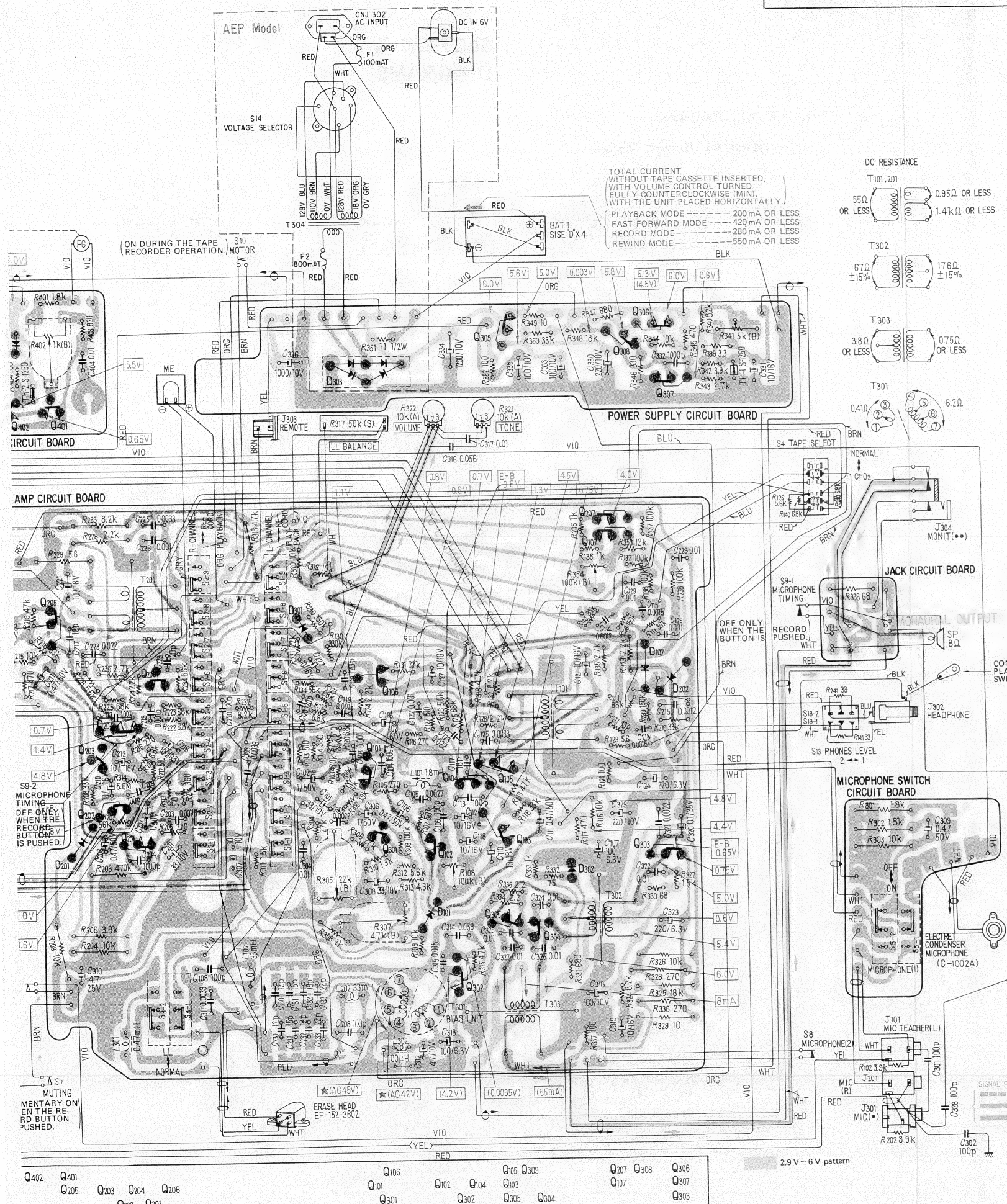
2. Make sure that the reading is as specified.

Specification: 45 ~ 75 mA.

5-2. MOUNTING DIAGRAM

— Conductor Side —

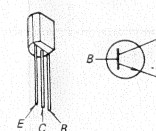




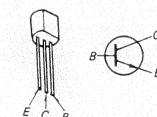
Semiconductor Lists

| | | | |
|-----------------|---------|------------------|---------|
| Q101 (Q201) ... | 2SC1361 | D101 (D201)..... | 1T-40 |
| Q102 (Q202) ... | 2SC1363 | D102 (D202)..... | 1T-40 |
| Q103 (Q203) ... | 2SC1363 | D301 | 1T-22 |
| Q104 (Q204) ... | 2SC1363 | D302 | VD-1123 |
| Q105 (Q205) ... | 2SC1363 | D303..... | SIRB-10 |
| Q106 (Q206) ... | 2SC1363 | D401..... | 1T-40 |
| Q107 (Q207) ... | 2SC1363 | D402..... | 10D-2 |
| Q301 | 2SC1361 | Th1, 2 | S-1250 |
| Q302 | 2SC1474 | | |
| Q303 | 2SC1363 | | |
| Q304 | 2SC1474 | | |
| Q305 | 2SC1474 | | |
| Q306 | 2SA772 | | |
| Q307 | 2SC1363 | | |
| Q308 | 2SC1363 | | |
| Q309 | 2SC1363 | | |
| Q401 | 2SC1363 | | |
| Q402 | 2SB475 | | |
| Q403 | 2SC1474 | | |

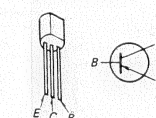
2SC1361
2SC1363



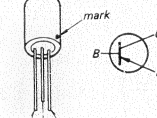
2SC1474



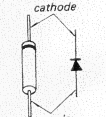
2SA772



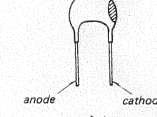
2SB475



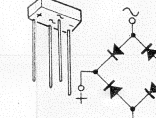
1T-40
1T-22



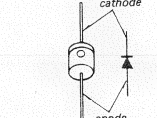
VD-1123



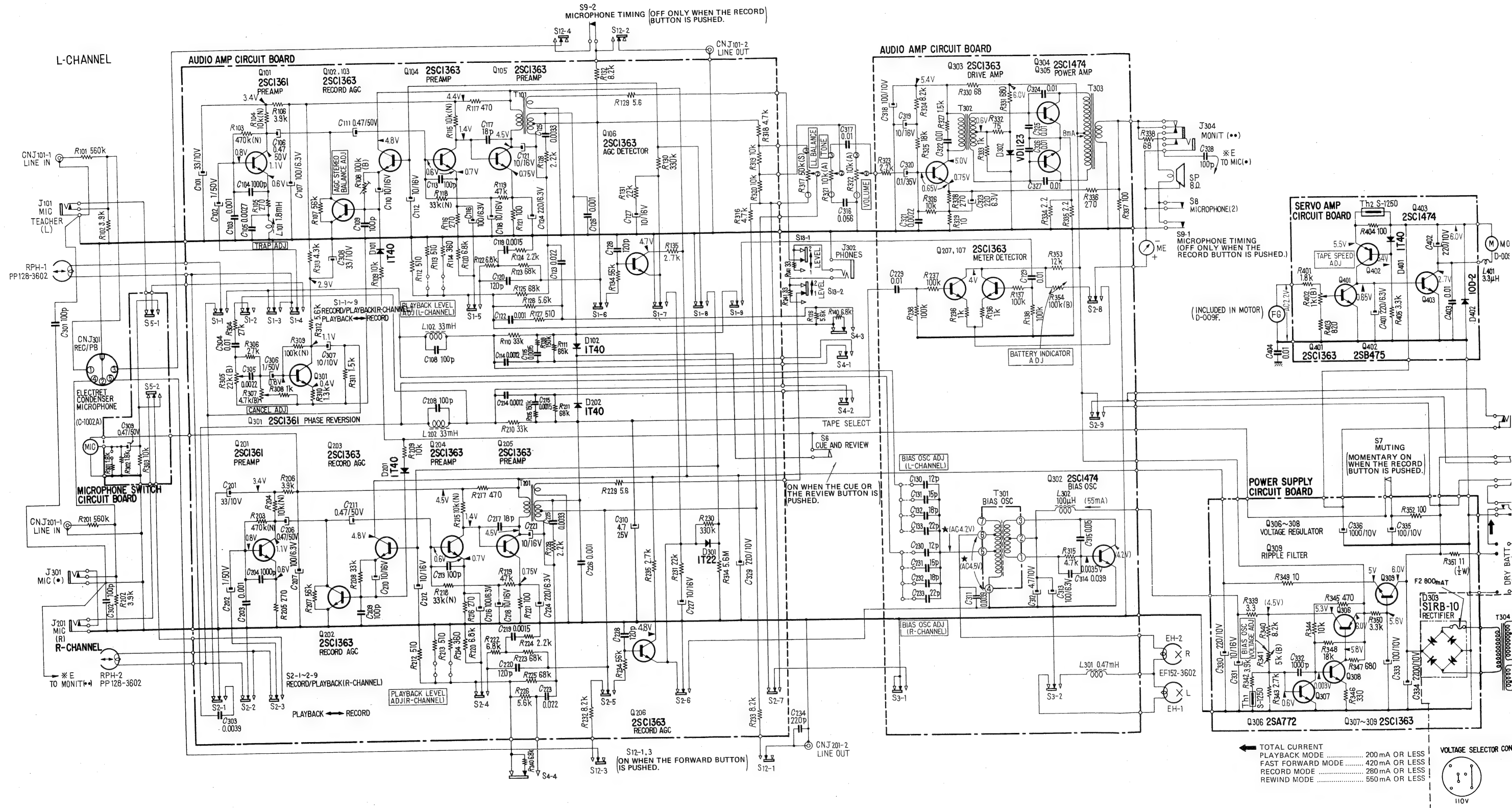
SIRB-10



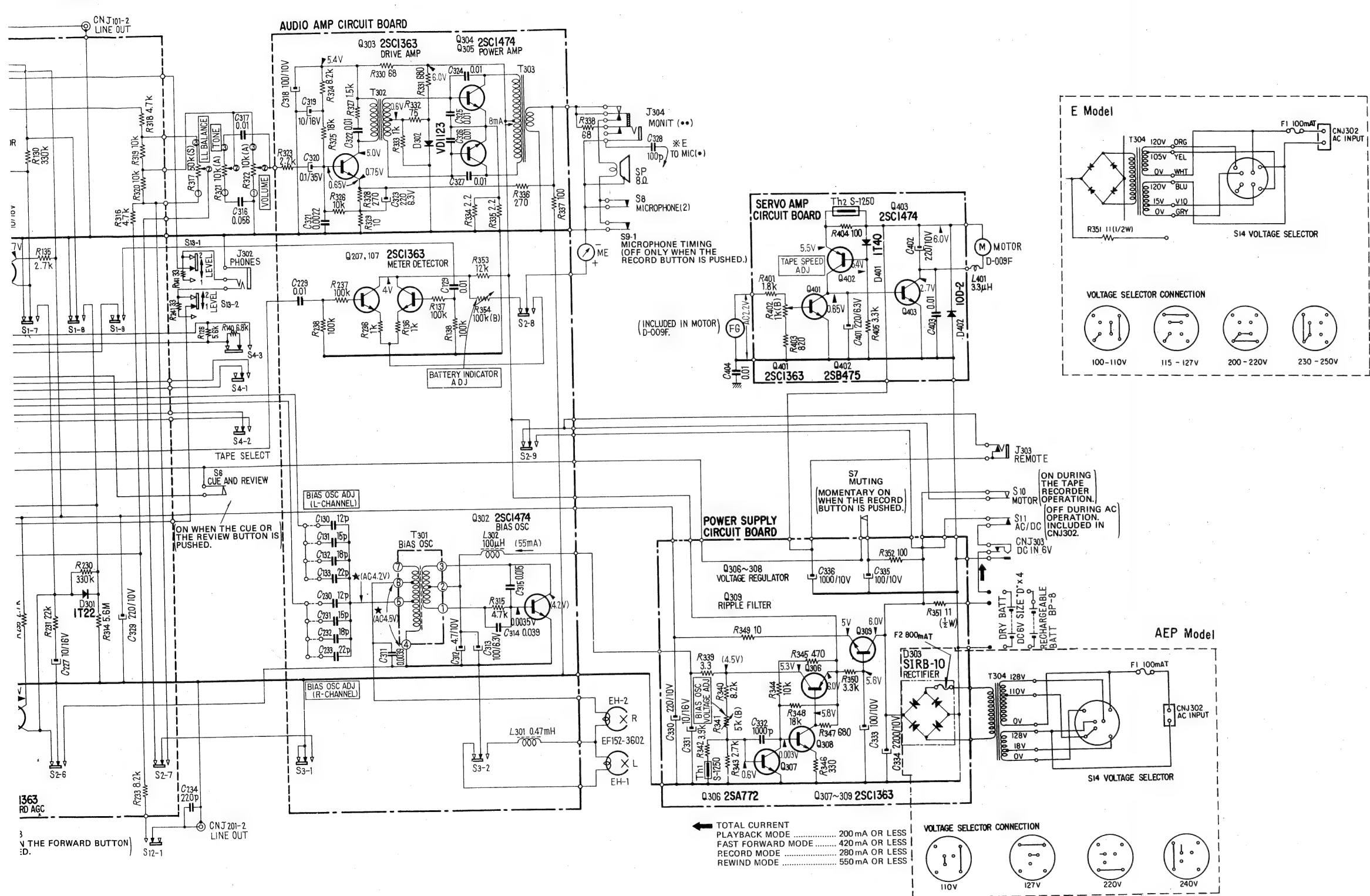
10D-2



5.3. SCHEMATIC DIAGRAM



3 (OFF ONLY WHEN THE RECORD
BUTTON IS PUSHED.)



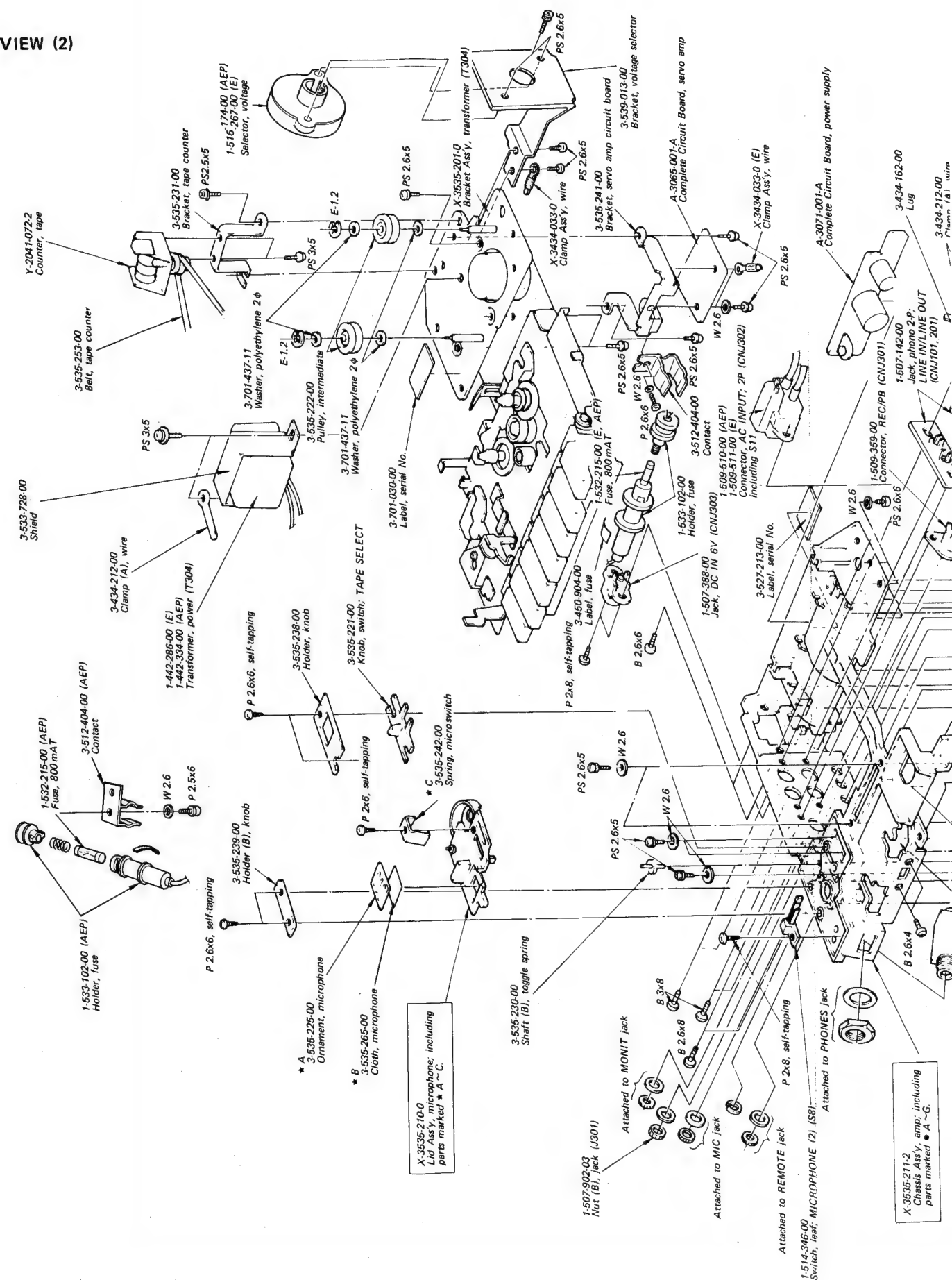
Note:

- All resistors are in Ω , $\frac{1}{2}W$ and carbon type unless otherwise indicated. $k = 1000$.
- All capacitors are in μF unless otherwise indicated. $p = \mu\mu$.
- Letter in () suffixed to variable resistor value indicates characteristics.
- /// : chassis ground
- (N) : low noise resistor
- Voltage values shown are measured to chassis ground with a voltmeter (20 $k\Omega/V$).
- no mark : playback mode
- () : record mode
- Voltage values between the emitter and the base of transistors are measured with 2.5 V range.
- Voltage values marked with * are measured with VTVM.
- Connect R301 resistor into the circuit when a red mark microphone is used.
- Switch mode:

| Ref. No. | Switch | Mode |
|------------|---|--|
| S1-1-1-9 | record/playback (L-channel) | playback |
| S2-1-2-9 | record/playback (R-channel) | playback |
| S3-1-3-2 | LL/NORMAL | NORMAL |
| S4-1-4-4 | TAPE SELECT (CrO ₂ /NORMAL) | NORMAL |
| S5-1-5-2 | MICROPHONE (1) (ON when the built-in microphone is used.) | OFF |
| S6 | CUE and REVIEW (ON when the CUE or the REVIEW button is pushed.) | OFF |
| S7 | muting (momentary ON when the record button is pushed.) | OFF |
| S8 | MICROPHONE (2) (OFF when the built-in microphone is used. joined to S5.) | ON |
| S9-1-9-2 | microphone timing (this switch turns OFF to stop the output signals through REC/PB connector in record mode.) | ON |
| S10 | motor (ON during the tape recorder operation.) | OFF |
| S11 | AC/DC (OFF during AC operation. included in CNJ302.) | DC |
| S12-1-12-4 | LINE OUT and REC/PB (ON when the forward button is pushed.) | OFF |
| S13 | PHONES LEVEL (1/2) | 2 |
| S14 | voltage selector | E: 100-110 V, 115-127 V 200-220 V, 230-250 V AEP: 110 V, 127 V, 220 V, 240 V |

6-2. EXPLODED VIEW (2)

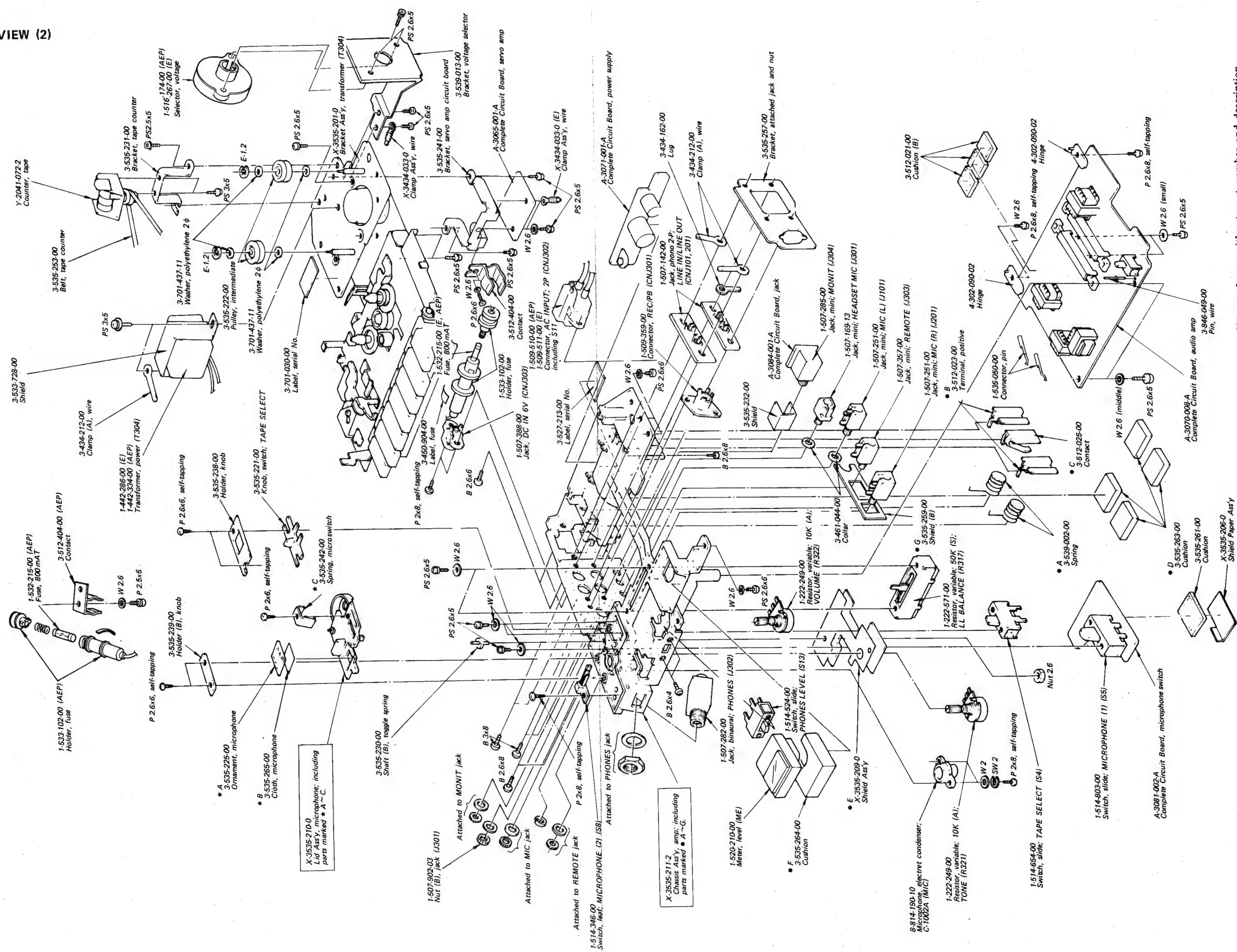
6-2. EXPLODED VIEW (2)



Note:

- Items without part number and description are not available.
- All screws are Phillips (cross recess) type unless otherwise noted.
- (-) = slotted head

6-2. EXPLODED VIEW (2)



Note: ○ Items without part number and description are not available.
○ All screws are Phillips (cross recess) type unless otherwise noted.
(-) = slotted head

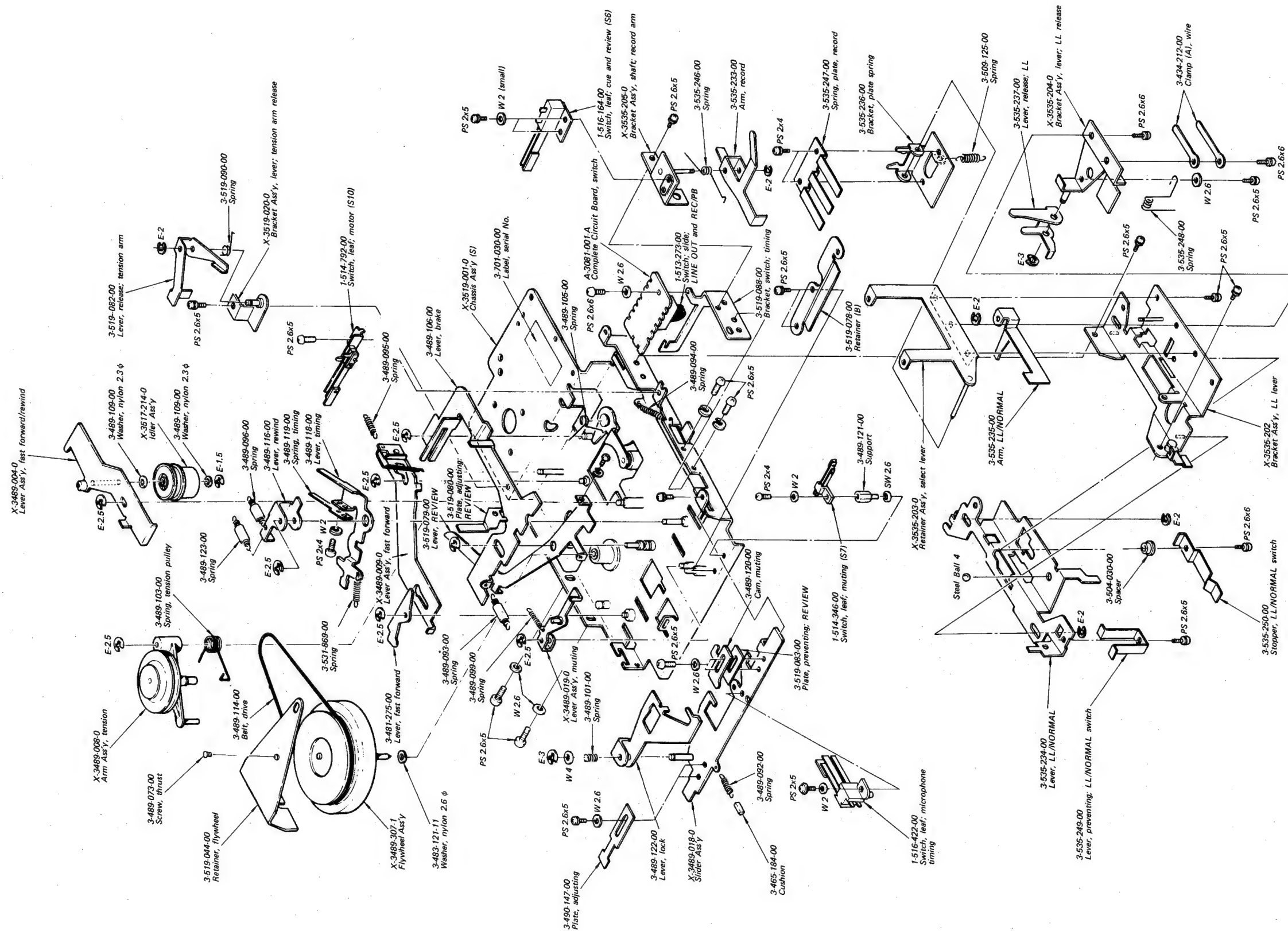
This diagram illustrates the exploded view of a record player mechanism, showing the relationship between various components. The parts are labeled with part numbers and descriptions, often preceded by a letter (A-J) indicating a specific assembly step or sub-assembly.

Key Components and Labels:

- Motor and Drive:** 3-489-008-00 Motor, D-080F (M); 3-489-117-00 Pulley, motor; 3-489-042-00 Cushion, motor.
- Head and Pick-up:** 8-825-585-00 Head, crane; EF152-3602 (EH); 3-519-035-00 Pick up, tension; 3-519-036-00 Gear, cam; 3-519-037-00 Head, record/playback; PF128-3602; 3-519-041-00 Washer, pick-up; 3-519-032-00 Arm, pick-up; 3-481-272-00 Spring; 3-519-039-00 Spring; 3-519-038-00 Spring; 3-519-034-00 Spring; 3-519-033-00 Spring; 3-519-032-00 Spring; 3-519-031-00 Spring; 3-519-030-00 Spring; 3-519-029-00 Spring; 3-519-028-00 Spring; 3-519-027-00 Spring; 3-519-026-00 Spring; 3-519-025-00 Spring; 3-519-024-00 Spring; 3-519-023-00 Spring; 3-519-022-00 Spring; 3-519-021-00 Spring; 3-519-020-00 Spring; 3-519-019-00 Spring; 3-519-018-00 Spring; 3-519-017-00 Spring; 3-519-016-00 Spring; 3-519-015-00 Spring; 3-519-014-00 Spring; 3-519-013-00 Spring; 3-519-012-00 Spring; 3-519-011-00 Spring; 3-519-010-00 Spring; 3-519-009-00 Spring; 3-519-008-00 Spring; 3-519-007-00 Spring; 3-519-006-00 Spring; 3-519-005-00 Spring; 3-519-004-00 Spring; 3-519-003-00 Spring; 3-519-002-00 Spring; 3-519-001-00 Spring; 3-519-000-00 Spring.
- Reel and Spindle:** 3-489-110-00 Cap, reel spindle; 3-489-107-00 Spring; 3-489-106-00 Washer, nylon 1.6 φ; 3-489-105-00 Washer, nylon 1.6 φ; 3-489-104-00 Spring; 3-489-103-00 Spring; 3-489-102-00 Spring, pinch roller; 3-489-101-00 Spring, pinch roller; 3-489-100-00 Spring, pinch roller; 3-489-099-00 Spring, pinch roller; 3-489-098-00 Spring, pinch roller; 3-489-097-00 Spring, pinch roller; 3-489-096-00 Spring, pinch roller; 3-489-095-00 Spring, pinch roller; 3-489-094-00 Spring, pinch roller; 3-489-093-00 Spring, pinch roller; 3-489-092-00 Spring, pinch roller; 3-489-091-00 Spring, pinch roller; 3-489-090-00 Spring, pinch roller; 3-489-089-00 Spring, pinch roller; 3-489-088-00 Spring, pinch roller; 3-489-087-00 Spring, pinch roller; 3-489-086-00 Spring, pinch roller; 3-489-085-00 Spring, pinch roller; 3-489-084-00 Spring, pinch roller; 3-489-083-00 Spring, pinch roller; 3-489-082-00 Spring, pinch roller; 3-489-081-00 Spring, pinch roller; 3-489-080-00 Spring, pinch roller; 3-489-079-00 Spring, pinch roller; 3-489-078-00 Spring, pinch roller; 3-489-077-00 Spring, pinch roller; 3-489-076-00 Spring, pinch roller; 3-489-075-00 Spring, pinch roller; 3-489-074-00 Spring, pinch roller; 3-489-073-00 Spring, pinch roller; 3-489-072-00 Spring, pinch roller; 3-489-071-00 Spring, pinch roller; 3-489-070-00 Spring, pinch roller; 3-489-069-00 Spring, pinch roller; 3-489-068-00 Spring, pinch roller; 3-489-067-00 Spring, pinch roller; 3-489-066-00 Spring, pinch roller; 3-489-065-00 Spring, pinch roller; 3-489-064-00 Spring, pinch roller; 3-489-063-00 Spring, pinch roller; 3-489-062-00 Spring, pinch roller; 3-489-061-00 Spring, pinch roller; 3-489-060-00 Spring, pinch roller; 3-489-059-00 Spring, pinch roller; 3-489-058-00 Spring, pinch roller; 3-489-057-00 Spring, pinch roller; 3-489-056-00 Spring, pinch roller; 3-489-055-00 Spring, pinch roller; 3-489-054-00 Spring, pinch roller; 3-489-053-00 Spring, pinch roller; 3-489-052-00 Spring, pinch roller; 3-489-051-00 Spring, pinch roller; 3-489-050-00 Spring, pinch roller; 3-489-049-00 Spring, pinch roller; 3-489-048-00 Spring, pinch roller; 3-489-047-00 Spring, pinch roller; 3-489-046-00 Spring, pinch roller; 3-489-045-00 Spring, pinch roller; 3-489-044-00 Spring, pinch roller; 3-489-043-00 Spring, pinch roller; 3-489-042-00 Spring, pinch roller; 3-489-041-00 Spring, pinch roller; 3-489-040-00 Spring, pinch roller; 3-489-039-00 Spring, pinch roller; 3-489-038-00 Spring, pinch roller; 3-489-037-00 Spring, pinch roller; 3-489-036-00 Spring, pinch roller; 3-489-035-00 Spring, pinch roller; 3-489-034-00 Spring, pinch roller; 3-489-033-00 Spring, pinch roller; 3-489-032-00 Spring, pinch roller; 3-489-031-00 Spring, pinch roller; 3-489-030-00 Spring, pinch roller; 3-489-029-00 Spring, pinch roller; 3-489-028-00 Spring, pinch roller; 3-489-027-00 Spring, pinch roller; 3-489-026-00 Spring, pinch roller; 3-489-025-00 Spring, pinch roller; 3-489-024-00 Spring, pinch roller; 3-489-023-00 Spring, pinch roller; 3-489-022-00 Spring, pinch roller; 3-489-021-00 Spring, pinch roller; 3-489-020-00 Spring, pinch roller; 3-489-019-00 Spring, pinch roller; 3-489-018-00 Spring, pinch roller; 3-489-017-00 Spring, pinch roller; 3-489-016-00 Spring, pinch roller; 3-489-015-00 Spring, pinch roller; 3-489-014-00 Spring, pinch roller; 3-489-013-00 Spring, pinch roller; 3-489-012-00 Spring, pinch roller; 3-489-011-00 Spring, pinch roller; 3-489-010-00 Spring, pinch roller; 3-489-009-00 Spring, pinch roller; 3-489-008-00 Spring, pinch roller; 3-489-007-00 Spring, pinch roller; 3-489-006-00 Spring, pinch roller; 3-489-005-00 Spring, pinch roller; 3-489-004-00 Spring, pinch roller; 3-489-003-00 Spring, pinch roller; 3-489-002-00 Spring, pinch roller; 3-489-001-00 Spring, pinch roller; 3-489-000-00 Spring, pinch roller.
- Buttons and Controls:** 3-519-047-00 Ornament, button; EJECT; 3-519-046-00 Ornament, button; EJECT; 3-519-045-00 Ornament, button; EJECT; 3-519-044-00 Ornament, button; EJECT; 3-519-043-00 Ornament, button; EJECT; 3-519-042-00 Ornament, button; EJECT; 3-519-041-00 Ornament, button; EJECT; 3-519-040-00 Ornament, button; EJECT; 3-519-039-00 Ornament, button; EJECT; 3-519-038-00 Ornament, button; EJECT; 3-519-037-00 Ornament, button; EJECT; 3-519-036-00 Ornament, button; EJECT; 3-519-035-00 Ornament, button; EJECT; 3-519-034-00 Ornament, button; EJECT; 3-519-033-00 Ornament, button; EJECT; 3-519-032-00 Ornament, button; EJECT; 3-519-031-00 Ornament, button; EJECT; 3-519-030-00 Ornament, button; EJECT; 3-519-029-00 Ornament, button; EJECT; 3-519-028-00 Ornament, button; EJECT; 3-519-027-00 Ornament, button; EJECT; 3-519-026-00 Ornament, button; EJECT; 3-519-025-00 Ornament, button; EJECT; 3-519-024-00 Ornament, button; EJECT; 3-519-023-00 Ornament, button; EJECT; 3-519-022-00 Ornament, button; EJECT; 3-519-021-00 Ornament, button; EJECT; 3-519-020-00 Ornament, button; EJECT; 3-519-019-00 Ornament, button; EJECT; 3-519-018-00 Ornament, button; EJECT; 3-519-017-00 Ornament, button; EJECT; 3-519-016-00 Ornament, button; EJECT; 3-519-015-00 Ornament, button; EJECT; 3-519-014-00 Ornament, button; EJECT; 3-519-013-00 Ornament, button; EJECT; 3-519-012-00 Ornament, button; EJECT; 3-519-011-00 Ornament, button; EJECT; 3-519-010-00 Ornament, button; EJECT; 3-519-009-00 Ornament, button; EJECT; 3-519-008-00 Ornament, button; EJECT; 3-519-007-00 Ornament, button; EJECT; 3-519-006-00 Ornament, button; EJECT; 3-519-005-00 Ornament, button; EJECT; 3-519-004-00 Ornament, button; EJECT; 3-519-003-00 Ornament, button; EJECT; 3-519-002-00 Ornament, button; EJECT; 3-519-001-00 Ornament, button; EJECT; 3-519-000-00 Ornament, button; EJECT.
- Other Components:** 3-489-048-00 Ornament, button; EJECT; 3-489-047-00 Ornament, button; EJECT; 3-489-046-00 Ornament, button; EJECT; 3-489-045-00 Ornament, button; EJECT; 3-489-044-00 Ornament, button; EJECT; 3-489-043-00 Ornament, button; EJECT; 3-489-042-00 Ornament, button; EJECT; 3-489-041-00 Ornament, button; EJECT; 3-489-040-00 Ornament, button; EJECT; 3-489-039-00 Ornament, button; EJECT; 3-

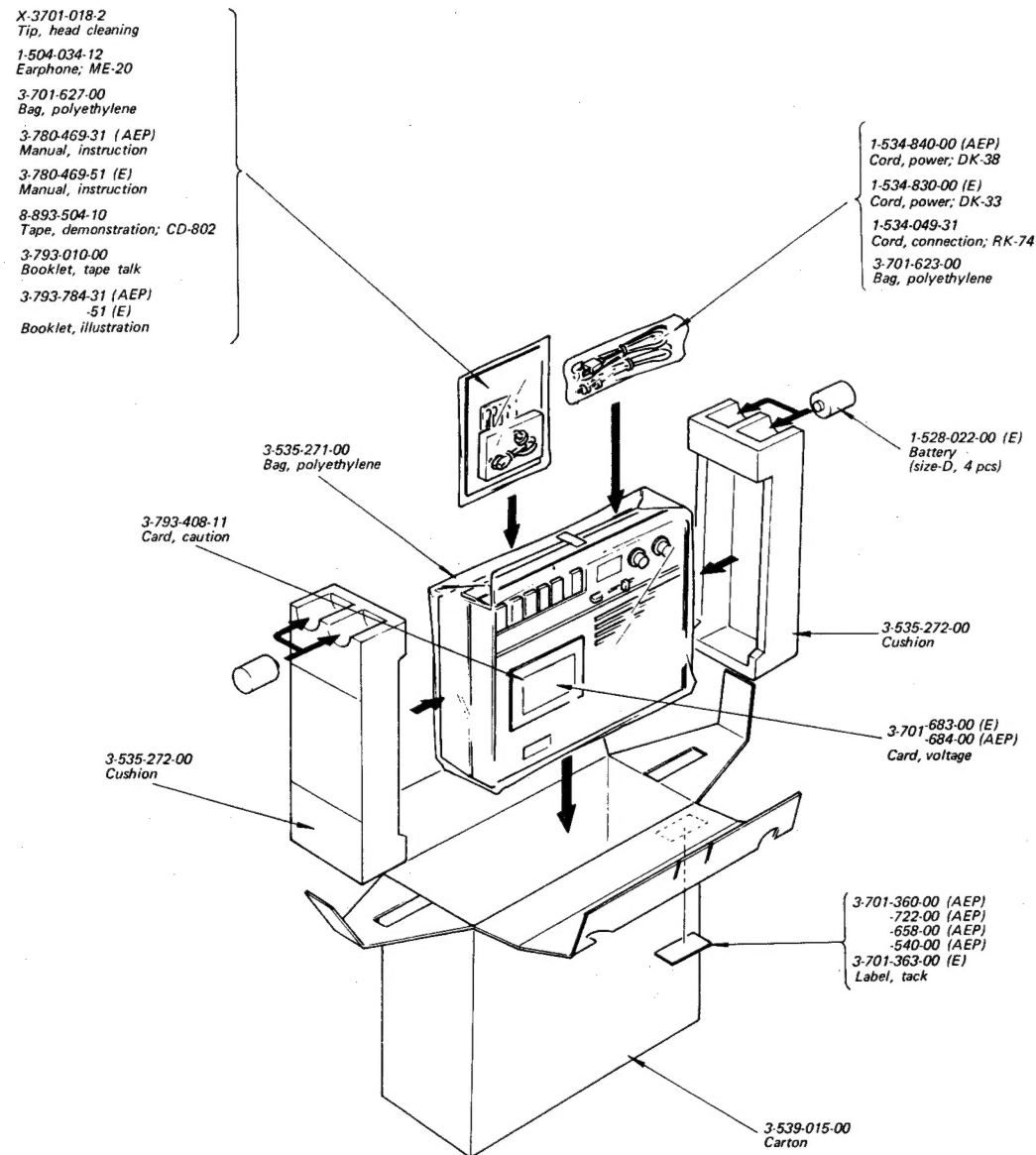
Note: ○ Items without part number and description are not available.
○ All screws are Phillips (cross recess) type unless otherwise noted.
(-) = slotted head

6-4. EXPLODED VIEW (4)



Note: ○ Items without part number and description are not available.
○ All screws are Phillips (cross recess) type unless otherwise noted.
(-) = slotted head

6-5. PACKING



Note: ◦ Items without part number and description are not available.

SECTION 7 ELECTRICAL PARTS LIST

| Ref. No. | Part No. | Description | Ref. No. | Part No. | Description |
|--------------------------------|--------------|----------------------|---|--------------|----------------------------|
| COMPLETE CIRCUIT BOARDS | | | | | |
| | A-3065-001-A | Servo Amp | L301 | 1-407-488-00 | 470 μ H, microinductor |
| | A-3070-008-A | Audio Amp | L302 | 1-407-169-00 | 100 μ H, microinductor |
| | A-3071-001-A | Power Supply | L401 | 1-407-484-21 | 3.3 μ H, microinductor |
| | A-3081-001-A | Switch | TRANSFORMERS | | |
| | A-3081-002-A | Microphone Switch | T101, 201 | 1-427-317-00 | Output |
| | A-3084-001-A | Jack | T301 | 1-433-166-00 | Bias Osc |
| | A-3089-001-A | Record/Playback Head | T302 | 1-423-049-00 | Input |
| | | | T303 | 1-427-256-00 | Output |
| | | | T304 | 1-442-286-00 | Power (E) |
| | | | | 1-442-334-00 | Power (AEP) |
| SEMICONDUCTORS | | | | | |
| Q101, 201 | Transistor | 2SC1361 | CAPACITORS | | |
| Q102, 202 | Transistor | 2SC1363 | All capacitors are in μ F unless otherwise indicated. (p = μ μ, elect = electrolytic) | | |
| Q103, 203 | Transistor | 2SC1363 | C101, 202 | 1-121-402-11 | 33 10V elect |
| Q104, 204 | Transistor | 2SC1363 | C102, 202 | 1-121-391-11 | 1 50V elect |
| Q105, 205 | Transistor | 2SC1363 | C103, 203 | 1-105-661-12 | 0.001 50V mylar |
| | | | C104, 204 | 1-102-074-11 | 1000 P 50V ceramic |
| Q106, 206 | Transistor | 2SC1363 | C105 | 1-105-666-12 | 0.0027 50V mylar |
| Q107, 207 | Transistor | 2SC1363 | | | |
| Q301 | Transistor | 2SC1361 | C106, 206 | 1-121-726-11 | 0.47 50V elect |
| Q302 | Transistor | 2SC1474 | C107, 207 | 1-121-413-11 | 100 6.3V elect |
| Q303 | Transistor | 2SC1363 | C108, 208 | 1-107-169-11 | 100 P 500V silvered mica |
| Q304, 305 | Transistor | 2SC1474 | C109, 209 | 1-102-106-11 | 100 P 50V ceramic |
| Q306 | Transistor | 2SA772 | C110, 210 | 1-121-651-11 | 10 16V elect |
| Q307 ~ 309 | Transistor | 2SC1363 | | | |
| Q401 | Transistor | 2SC1363 | C111, 211 | 1-121-726-11 | 0.47 50V elect |
| Q402 | Transistor | 2SB475 | C112, 212 | 1-121-651-11 | 10 16V elect |
| Q403 | Transistor | 2SC1474 | C113, 213 | 1-102-106-11 | 100 P 50V ceramic |
| D101, 201 | Diode | 1T-40 | C114, 214 | 1-105-662-12 | 0.0012 50V mylar |
| D102, 202 | Diode | 1T-40 | C115, 215 | 1-105-663-12 | 0.0015 50V mylar |
| D301 | Diode | 1T-22 | | | |
| D302 | Diode | VD-1123 | C116, 216 | 1-121-413-11 | 100 6.3V elect |
| D303 | Diode | S1RB10 | C117, 217 | 1-107-113-11 | 18 P 50V silvered mica |
| D401 | Diode | 1T-40 | C118, 218 | 1-121-651-11 | 10 16V elect |
| D402 | Diode | 10D-2 | C119, 219 | 1-105-663-12 | 0.0015 50V mylar |
| Th1, 2 | 1-800-199-11 | Thermistor S-1250 | C120, 220 | 1-107-133-11 | 120 P 50V silvered mica |
| COILS | | | | | |
| L101 | 1-409-141-00 | 1.8 mH | C121, 221 | 1-121-651-11 | 10 16V elect |
| L102 | 1-407-510-00 | 33 mH, microinductor | C122 | 1-105-661-12 | 0.001 50V mylar |
| L202 | 1-407-561-00 | 33 mH, microinductor | C123, 223 | 1-105-677-12 | 0.022 50V mylar |
| | | | C124, 224 | 1-121-419-11 | 220 6.3V elect |
| | | | C125, 225 | 1-105-667-12 | 0.0033 50V mylar |
| | | | C126, 226 | 1-105-661-12 | 0.001 50V mylar |
| | | | C127, 227 | 1-121-651-11 | 10 16V elect |

| Ref. No. | Part No. | Description | | |
|------------|--------------|-------------|------|----------------|
| C128, 228 | 1-107-133-11 | 120 P | 50V | silvered mica |
| C129, 229 | 1-105-833-12 | 0.01 | 50V | mylar |
| C130, 230 | 1-107-050-11 | 12 P | 500V | silvered mica |
| C131, 231 | 1-107-051-11 | 15 P | 500V | silvered mica |
| C132, 232 | 1-107-001-11 | 18 P | 500V | silvered mica |
| C133, 233 | 1-107-052-11 | 22 P | 500V | silvered mica |
| C201 | 1-131-195-11 | 33 | 10V | solid tantalum |
| C234 | 1-102-110-11 | 220 P | 50V | ceramic |
| C301, 302 | 1-102-106-11 | 100 P | 50V | ceramic |
| C303 | 1-105-669-12 | 0.0039 | 50V | mylar |
| C304 | 1-105-673-12 | 0.01 | 50V | mylar |
| C305 | 1-105-665-12 | 0.0022 | 50V | mylar |
| C306 | 1-121-391-11 | 1 | 50V | elect |
| C307 | 1-131-193-11 | 10 | 10V | solid tantalum |
| C308 | 1-121-402-11 | 33 | 10V | elect |
| C309 | 1-121-726-00 | 0.47 | 50V | elect |
| C310 | 1-121-395-11 | 4.7 | 25V | elect |
| C311 | 1-129-861-11 | 0.0039 | 500V | polypropylene |
| C312 | 1-131-192-11 | 4.7 | 10V | solid tantalum |
| C313 | 1-121-413-11 | 100 | 6.3V | elect |
| C314 | 1-105-680-12 | 0.039 | 50V | mylar |
| C315 | 1-105-675-12 | 0.015 | 50V | mylar |
| C316 | 1-105-682-12 | 0.056 | 50V | mylar |
| C317 | 1-105-673-12 | 0.01 | 50V | mylar |
| C318 | 1-121-414-11 | 100 | 10V | elect |
| C319 | 1-121-651-11 | 10 | 16V | elect |
| C320 | 1-131-209-21 | 0.1 | 35V | solid tantalum |
| C321 | 1-105-665-12 | 0.0022 | 50V | mylar |
| C322 | 1-105-833-12 | 0.01 | 50V | mylar |
| C323 | 1-121-419-11 | 220 | 6.3V | elect |
| C324 ~ 327 | 1-101-923-11 | 0.01 | 25V | ceramic |
| C328 | 1-102-106-11 | 100 P | 50V | ceramic |
| C329, 330 | 1-121-420-11 | 220 | 10V | elect |
| C331 | 1-121-651-11 | 10 | 16V | elect |
| C332 | 1-102-074-11 | 1000 P | 50V | ceramic |
| C333 | 1-121-414-11 | 100 | 10V | elect |
| C334 | 1-121-659-11 | 2200 | 10V | elect |
| C335 | 1-121-414-11 | 100 | 10V | elect |
| C336 | 1-121-736-11 | 1000 | 10V | elect |
| C401 | 1-121-419-11 | 220 | 6.3V | elect |
| C402 | 1-121-420-11 | 220 | 10V | elect |
| C403, 404 | 1-101-923-11 | 0.01 | 25V | ceramic |

| <u>Ref. No.</u> | <u>Part No.</u> | <u>Description</u> | | |
|--|-----------------|--------------------|------------|--|
| RESISTORS | | | | |
| All resistors are ¼W, carbon type, and in Ω unless otherwise indicated. (k = 1000, M = 1000 k) | | | | |
| R101, 201 | 1-244-739-11 | 560 | | |
| R102, 202 | 1-244-687-11 | 3.9 k | | |
| R103, 203 | 1-242-737-09 | 470 k | low noise | |
| R104, 204 | 1-242-697-09 | 10 k | low noise | |
| R105, 205 | 1-242-659-11 | 270 | | |
| R106, 206 | 1-242-687-11 | 3.9 k | | |
| R107, 207 | 1-242-715-11 | 56 k | | |
| R108 | 1-222-845-00 | 100 k (B) | adjustable | |
| R109 | 1-242-697-11 | 10 k | | |
| R110, 210 | 1-242-709-11 | 33 k | | |
| R111, 211 | 1-242-717-11 | 68 k | | |
| R112, 212 | 1-242-666-11 | 510 | | |
| R113, 213 | | | | |
| R114, 214 | 1-242-662-11 | 360 | | |
| R115, 215 | 1-242-697-09 | 10 k | low noise | |
| R116, 216 | 1-242-659-11 | 270 | | |
| R117, 217 | 1-242-665-11 | 470 | | |
| R118, 218 | 1-242-709-09 | 33 k | low noise | |
| R119, 219 | 1-242-713-11 | 47 k | | |
| R120, 220 | 1-242-693-11 | 6.8 k | | |
| R121, 221 | 1-242-649-11 | 100 | | |
| R122, 222 | 1-242-693-11 | 6.8 k | | |
| R123, 223 | 1-242-717-11 | 68 k | | |
| R124, 224 | 1-242-681-11 | 2.2 k | | |
| R125, 225 | 1-242-717-11 | 68 k | | |
| R126 | 1-242-691-11 | 5.6 k | | |
| R127 | 1-242-666-11 | 510 | | |
| R128 | 1-242-681-11 | 2.2 k | | |
| R129 | 1-242-623-11 | 82 | | |
| R130, 230 | 1-242-733-11 | 330 k | | |
| R131, 231 | 1-242-705-11 | 22 k | | |
| R132, 232 | 1-242-695-11 | 8.2 k | | |
| R134, 234 | 1-242-715-11 | 56 k | | |
| R135, 235 | 1-242-683-11 | 2.7 k | | |
| R136, 236 | 1-242-673-11 | 1 k | | |
| R137, 237 | 1-242-721-11 | 100 k | | |
| R138, 238 | | | | |
| R139, 239 | 1-242-725-11 | 150 k | | |
| R140, 240 | 1-242-693-11 | 6.8 k | | |
| R141, 241 | 1-242-637-11 | 33 | | |

| Ref. No. | Part No. | Description | | |
|-----------|--------------|---------------------|--------------|--|
| R203 | 1-242-737-09 | 470 k | low noise | |
| R204 | 1-242-697-09 | 10 k | low noise | |
| R206 | 1-244-687-11 | 3.9 k | | |
| R208 | 1-244-709-11 | 33 k | | |
| R209 | 1-244-697-11 | 10 k | | |
| R226 | 1-244-691-11 | 5.6 k | | |
| R228 | 1-244-681-11 | 2.2 k | | |
| R229 | 1-244-623-11 | 8.2 | | |
| R233 | 1-244-695-11 | 8.2 k | | |
| R301, 302 | 1-244-679-11 | 1.8 k | | |
| R303 | 1-244-697-11 | 10 k | | |
| R304 | 1-242-707-11 | 27 k | | |
| R305 | 1-222-775-00 | 22 k (B) | adjustable | |
| R306 | 1-242-707-11 | 27 k | | |
| R307 | 1-222-773-00 | 4.7 k (B) | adjustable | |
| R308 | 1-242-673-11 | 1 k | | |
| R309 | 1-242-721-09 | 100 k | low noise | |
| R310 | 1-242-676-11 | 1.3 k | | |
| R311 | 1-209-766-11 | 1.5 k | 1/16 W micro | |
| R312 | 1-242-691-11 | 5.6 k | | |
| R313 | 1-242-688-11 | 4.3 k | | |
| R314 | 1-202-473-31 | 5.6 M | composition | |
| R315 | 1-242-689-11 | 4.7 k | | |
| R316 | 1-244-689-11 | 4.7 k | | |
| R317 | 1-222-571-00 | 50 k (S) | adjustable | |
| R318 | 1-242-689-11 | 4.7 k | | |
| R319, 320 | 1-242-697-11 | 10 k | | |
| R321 | 1-222-249-00 | 10 k (A), variable; | TONE | |
| R322 | 1-222-249-00 | 10 k (A), variable; | VOLUME | |
| R323 | 1-242-681-11 | 2.2 k | | |
| R324 | 1-242-695-11 | 8.2 k | | |
| R325 | 1-244-703-11 | 18 k | | |
| R326 | 1-244-697-11 | 10 k | | |
| R327 | 1-242-677-11 | 1.5 k | | |
| R328 | 1-244-659-11 | 270 | | |
| R329 | 1-244-625-11 | 10 | | |
| R330 | 1-242-645-11 | 68 | | |
| R331 | 1-242-669-11 | 680 | | |
| R332 | 1-242-646-11 | 75 | | |
| R333 | 1-242-673-11 | 1 k | | |
| R334, 335 | 1-242-609-11 | 2.2 | | |
| R336 | 1-244-659-11 | 270 | | |
| R337 | 1-242-649-11 | 100 | | |
| R338 | 1-202-355-11 | 68 | composition | |
| R339 | 1-242-613-11 | 3.3 | | |

| Ref. No. | Part No. | Description | | |
|-----------------|--------------|--------------------------------------|------------|--|
| R340 | 1-244-695-11 | 8.2 k | | |
| R341 | 1-221-311-21 | 5 k (B) | adjustable | |
| R342 | 1-242-687-11 | 3.9 k | | |
| R343 | 1-242-683-11 | 2.7 k | | |
| R344 | 1-242-697-11 | 10 k | | |
| R345 | 1-242-665-11 | 470 | | |
| R346 | 1-242-661-11 | 330 | | |
| R347 | 1-242-669-11 | 680 | | |
| R348 | 1-242-703-11 | 18 k | | |
| R349 | 1-242-625-11 | 10 | | |
| R350 | 1-242-685-11 | 3.3 k | | |
| R351 | 1-244-826-11 | 11 (1/2W) (E) | | |
| | 1-244-829-11 | 15 (1/2W) (AEP) | | |
| R352 | 1-242-649-11 | 100 | | |
| R353 | 1-242-699-11 | 12 k | | |
| R354 | 1-222-845-00 | 100 k (B) | adjustable | |
| R401 | 1-242-679-11 | 1.8 k | | |
| R402 | 1-222-771-00 | 1 k (B) | adjustable | |
| R403 | 1-242-671-11 | 820 | | |
| R404 | 1-242-649-11 | 100 | | |
| R405 | 1-242-685-11 | 3.3 k | | |
| SWITCHES | | | | |
| S1, 2 | 1-514-976-00 | Slide, record/playback | | |
| S3 | 1-514-803-00 | Slide, LL/NORMAL | | |
| S4 | 1-514-654-00 | Slide, TAPE SELECT | | |
| S5 | 1-514-803-00 | Slide, MICROPHONE (1) | | |
| S6 | 1-516-164-00 | Leaf, cue and review | | |
| S7 | 1-514-346-00 | Leaf, muting | | |
| S8 | 1-514-346-00 | Leaf, MICROPHONE (2) | | |
| S9 | 1-516-422-00 | Leaf, microphone timing | | |
| S10 | 1-514-792-00 | Leaf, motor | | |
| S11 | | Included in AC INPUT (CNJ302), AC/DC | | |
| S12 | 1-513-273-00 | Slide, LINE OUT (REC/PB) | | |
| S13 | 1-514-524-00 | Slide, PHONES LEVEL | | |
| S14 | 1-516-267-00 | Slide, voltage selector (E) | | |

| JACKS | | | |
|--------------|--------------|-----------------------------|--|
| J101, 201 | 1-507-251-00 | Mini, MIC | |
| J301 | 1-507-169-13 | Mini, MIC (HEADSET) | |
| J302 | 1-507-282-00 | Binaural, PHONES | |
| J303 | 1-507-357-00 | REMOTE (MIC) | |
| J304 | 1-507-285-00 | Mini, MONIT (HEADSET) | |
| CNJ101, 201 | 1-507-142-00 | Phono, 2P; LINE IN/LINE OUT | |
| CNJ301 | 1-509-359-00 | Connector, REC/PB | |

| <u>Ref. No.</u> | <u>Part No.</u> | <u>Description</u> |
|-----------------|-----------------|-----------------------------------|
| CNJ302 | 1-509-510-00 | 2P, AC INPUT, including S11 (AEP) |
| CNJ302 | 1-509-511-00 | 2P, AC INPUT, including S11 (E) |
| CNJ303 | 1-507-388-00 | DC IN 6V |

MISCELLANEOUS

| | | |
|----|--------------|-------------------------|
| EH | 8-825-585-00 | Head, erase; EF152-3602 |
| M | 8-834-009-50 | Motor, D-009F |
| ME | 1-520-210-00 | Meter, level |

| <u>Ref. No.</u> | <u>Part No.</u> | <u>Description</u> |
|-----------------|-----------------|---|
| MIC | 8-814-190-10 | Microphone, electret condenser; C-1002A |
| RPH | 8-829-236-20 | Head, record/playback; PP128-3602 |
| SP | 1-502-480-00 | Speaker |
| | 1-535-047-00 | Connector, solderless (E) |
| | 1-535-050-00 | Connector, pin |
| F1 | 1-532-084-00 | Fuse, 100 mAT |
| F2 | 1-532-215-00 | Fuse, 800 mAT (AEP) |
| | 1-533-102-00 | Holder, fuse |
| | 1-516-267-00 | Switch, voltage selector (E) |
| | 1-516-174-00 | Switch, voltage selector (AEP) |

SECTION 8 HARDWARE

Part No. Description

SCREWS

All screws are Phillips type (cross recess type)
unless otherwise indicated. (-): slotted head.

| | | |
|--------------|-----|---------------------|
| 7-621-170-39 | (-) | 2x4 |
| 7-621-255-15 | P | 2x3 |
| 7-621-255-25 | P | 2x4 |
| 7-621-255-45 | P | 2x6 |
| 7-621-259-25 | P | 2x4 |
| 7-621-259-35 | P | 2.6x5 |
| 7-621-259-65 | P | 2.6x10 |
| 7-621-770-50 | B | 2.6x6 |
| 7-621-770-62 | B | 2.6x5 |
| 7-621-770-94 | B | 2.6x10 |
| 7-671-771-38 | B | 2.6x8 |
| 7-621-773-65 | B | 2.6x4 |
| 7-682-523-03 | B | 2x3 |
| 7-682-549-05 | B | 3x8 |
| 7-682-624-01 | PS | 2x4 |
| 7-682-625-01 | PS | 2x5 |
| 7-628-253-92 | PS | 2.6x4 |
| 7-628-254-05 | PS | 2.6x5 |
| 7-628-254-15 | PS | 2.6x6 |
| 7-682-646-01 | PS | 3x5 |
| 7-682-648-01 | PS | 3x8 |
| 7-685-104-21 | P | 2x6, self-tapping |
| 7-685-105-21 | P | 2x8, self-tapping |
| 7-685-133-21 | P | 2.6x6, self-tapping |
| 7-685-134-21 | P | 2.6x8, self-tapping |

WASHERS

| | | |
|--------------|-----|--------|
| 7-623-105-01 | 2 | small |
| 7-623-105-02 | 2 | small |
| 7-623-105-15 | 2 | |
| 7-623-107-01 | 2.6 | small |
| 7-623-107-02 | 2.6 | small |
| 7-623-107-11 | 2.6 | middle |
| 7-623-107-12 | 2.6 | |

Part No. Description

| | | |
|--------------|-----|--------|
| 7-623-108-05 | 3 | middle |
| 7-623-108-11 | 3 | middle |
| 7-623-110-02 | 4 | |
| 7-623-205-22 | 2 | spring |
| 7-623-205-31 | 2 | spring |
| 7-623-207-22 | 2.6 | spring |

RETAINING RINGS

| | | |
|--------------|----|-----|
| 7-624-101-01 | E1 | 1.2 |
| 7-624-102-01 | E | 1.5 |
| 7-624-104-01 | E | 2 |
| 7-624-106-01 | E | 3 |
| 7-624-108-01 | E | 4 |
| 7-624-118-01 | E | 2.5 |
| 7-624-124-01 | C2 | |

NUT

| | |
|--------------|-----|
| 7-684-012-01 | 2.6 |
|--------------|-----|

LUG

| | |
|--------------|-----|
| 7-623-508-01 | 2.6 |
|--------------|-----|

STEEL BALLS

| | | |
|--------------|-----|------------|
| 7-671-112-01 | 2 | steel ball |
| 7-671-112-11 | 2.5 | steel ball |
| 7-671-114-01 | 4 | steel ball |

RIVET

| | |
|--------------|-------|
| 7-625-112-11 | 2.6x3 |
|--------------|-------|

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